SHIVAJI UNIVERSITY, KOLHAPUR.

Accredited By NAAC with 'A' Grade

Syllabus of Environmental Studies

As a Compulsory Paper for all

Undergraduate Programme

(To be implemented form academic year 2019)

Shivaji University, Kolhapur
Syllabus of Environmental Studies
as a Compulsory Paper for all Undergraduate Courses
2019-20

Unit 1. Nature of Environmental Studies :   **(3 lectures)**
  Definition, scope and importance.
  Multidisciplinary nature of environmental studies
  Need for public awareness.
  Concept of sustainability. Sustainable development and it's goals with Indian context.

Unit 2. Ecosystems :   **(9 lectures)**
  Concept of an ecosystem.
  Structure and function of an ecosystem.
  Producers, consumers and decomposers.
  Energy flow in the ecosystem.
  Ecological succession.
  Food chains, food webs and ecological pyramids.
  Introduction, types, characteristics features, structure and function of the following ecosystem :-
  a) Forest ecosystem, b) Grassland ecosystem, c) Desert ecosystem,
  d)Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)
  Degradation of the ecosystems and it's impacts.

Unit 3. Natural Resources and Associated Problems :   **(8 lectures)**
  a) Forest resources: Use and over-exploitation, deforestation, dams and their effects on forests and tribal people.
  b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
  c) Mineral resources: Usage and exploitation. Environmental effects of extracting and using mineral resources.
  d) Food resources: World food problem, changes caused by agriculture ,effect of modern agriculture, fertilizer-pesticide problems.
  e) Energy resources: Growing energy needs, renewable and non- renewable energy resources, use of alternate energy sources. Solar energy , Biomass energy, Nuclear energy,
  f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Consumerism ,ecological foot prints, carbon foot prints, carbon credits.
    Role of an individuals in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

Unit 4. Biodiversity and its conservation : (8 lectures)

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

Unit 5. Environmental Pollution : (8 lectures)

Definition: Causes, effects and control measures of: Air pollution,
Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution,
Nuclear hazards.
Global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust.
Solid waste Management: Causes, effects and control measures of urban and industrial
wastes. Solid waste management control rules.
Role of an individual in prevention of pollution.

Unit 6. Social Issues and the Environment : (9 lectures)

Human population growth, impact on environment. Human Health and welfare.
Environmental ethics: Role of Indian religious traditions and culture in conservation of
the environment.
Environmental movements- Chipko Movement, Appiko Movement, Silent Valley.
Resettlement and rehabilitation of people; its problems and concerns.
Water conservation, rain water harvesting, watershed management. water conservation
by Dr.Rajendra Singh, Anna Hazare etc.
Disaster management: floods, earthquake, cyclone, tsunami and landslides.
Wasteland reclamation.
Environmental communication and public awareness, case studies.

Unit 7. Environmental Protection- Policies and practises : (5 lectures)

Environmental Protection Act.
Air (Prevention and Control of Pollution) Act.
Water (Prevention and control of Pollution) Act
Wildlife Protection Act
Forest Conservation Act
National and International conventions and agreements on environment.

Unit 8. Field Work :   **(10 lectures)**

Visit to a local area to document environmental assets-

River/forest/grassland/hill/mountain.

or

Visit to a local polluted site – Urban/Rural/Industrial/Agricultural

or

Study of common plants, insects, birds.

or

Study of simple ecosystems - ponds, river, hill slopes, etc.
(Field work is equal to 10 lecture hours)

References :

1) Agarwal, K.C.2001, Environmental Biology, Nidi Pubi. Ltd., Bikaner.
2) Bharucha Erach, The Biodiversity of India, Mapin Publishing pvt. Ltd.,Ahmedabad 380013, India, Email:mapin@icenet.net (R)
3) Brunner R.C.,1989, Hazardous Waste Incineration, McGraw Hill Inc., 480p
4) Clank R.S. Marine Pollution, Clanderson Press Oxford (TB)
5) Cunningham, W.P. Cooper, T.H.Gorhani, E. & Hepworth, M.T.2001,
6) Environmental Encyclopedia, Jaico Publ. Hpise, Mumbai, 1196p

7) De A.K., Environmental Chemistry, Wiley Wastern Ltd.
8) Down to Earth , Cebtre fir Scuebce and Environment (R)
9) Gleick, H.,1993, Water in crisis, Pacific Institute for studies in Dev.,Environment & Security. Stockholm Env. Institute. Oxford Univ. Press 473p
10) Hawkins R.e., Encyclopedia of Indian Natural History, Bombay Natural History Society, Bombay (R)
11) Heywood, V.H.& Watson, R.T.1995, Global Biodiversity Assessment,Cambridge Univ. Press 1140p.
12) Jadhav, H.& Bhosale, V.M.1995, Environmental Protection and Laws, Himalaya Pub. Hcuse, Delhi 284p.
13) Mickinney, M.L.& School. R.M.1196, Environmental Science Systems & Solutions, Web enhanced edition, 639p.
14) Mhaskar A.K., Mastter Hazardous, Techno-Science Publications (TB)
15) Miller T.G.Jr., Environmental Science. Wadsworth Publications Co. (TB)
16) Odum, E.P.1971, Fundamentals of Ecology, W.B.Saunders Co. USA, 574p.
17) Rao M.N.& Datta, A.K.1987, Waste Water Treatment, Oxford & IBH Publ. Co. Pvt. Ltd., 345p
18) Sharma B.K., 2001, Environmental Chemistry, Gokel Publ. Hkouse, Meerut
19) Survey of the Environment, The Hindu (M)
20) Townsend C., Harper, J. and Michael Begon, Essentials of Ecology, Blackwell Science (TB)
21) Trivedi R.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, vol. I anfd II, Environmental Media (R)
22) Trivedi R.K. and P.K. Gokel, Intriduction to air pollution, Tecgbi-Science Publications (TB)
23) Wagner K.D.,1998, Environmental management, W.B. Saunders Co.Philadelphia, USA 499p.
24) Paryavaran shastra – Gholap T.N.
25) Paryavaran Sahastra – Gharapure
    M) Magazine   (R) Reference   (TB) Textbook

शिवाजी विद्यापीठ, कोल्हापूर
SHIVAJI UNIVERSITY, KOLHAPUR
मराठी अभ्यास मंडळ
Board of Studies in Marathi
पसंतीवर आधारित श्रेयांक पद्धती
Choice Based Credit System

Structure of Programme

Revised syllabus B. A. Part III (MARATHI)

Introduced from June 2020 onwards

Sr.No.	सत्र क्र. Sem.	अभ्यासपत्रिकेचे नाव	अभ्यास–पत्रिका क्र. Paper No.	Worklaod	Credits	Total Credits	Theory Marks	Term work/ Seminar
1	V	साहित्यविचार	VII	4 lectures/ week	4		40	10
2	V	मराठी भाषा व भाषाविज्ञान	VIII	4 lectures/ week	4		40	10
3	V	मध्ययुगीन मराठी वाङ्मयाचा इतिहास (प्रारंभ ते इ.स.१५००)	IX	4 lectures/ week	4	20	40	10
4	V	मराठी भाषा व अर्थार्जनाच्या संधी	X	4 lectures/ week	4		40	10
5	V	वाङ्मयप्रवाहाचे अध्ययन : मध्ययुगीन	XI	4 lectures/ week	4		40	10
Sr.No.	सत्र क्र. Sem.	अभ्यासपत्रिकेचे नाव	अभ्यास–पत्रिका क्र. Paper No.	Worklaod	Credits	Total Credits	Theory Marks	Term work/ Group project
6	VI	साहित्यविचार	XII	4 lectures/ week	4		40	10
7	VI	मराठी भाषा व भाषाविज्ञान	XIII	4 lectures/ week	4		40	10
8	VI	मध्ययुगीन मराठी वाङ्मयाचा इतिहास (इ.स.१५०० ते १८००)	XIV	4 lectures/ week	4	20	40	10
9	VI	मराठी भाषा व अर्थार्जनाच्या संधी	XV	4 lectures/ week	4		40	10
10	VI	वाङ्मयप्रकाराचे अध्ययन : ललितगद्य (व्यक्तिचित्रे)	XVI	4 lectures/ week	4		40	10

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बी.ए. भाग-३ : B.A. Part-III

अभ्यासक्रम : Syllabus

June, 2020 onward

सत्र-६ : Semister No. 6 : अभ्यासपत्रिका क्र. XII

Discipline Specific Elective (DSE-E126)

विद्याशाखीय विशेष निवड (DSE-E126)

साहित्यविचार

उद्दिष्टे :

१. शब्दशक्तींचे आकलन करून घेणे.

२. साहित्यातील रसाचे स्वरूप व रसप्रक्रिया समजून घेणे.

३. निर्मितीच्या आनंदाची मीमांसा करणे.

४. व्यवहार भाषा, शास्त्रभाषा आणि साहित्यभाषा यांतील भेद समजून घेणे.

५. साहित्यभाषेचे आकलन करून घेणे.

६. भाषेतील छंद व वृत्ते यांचा अभ्यास करणे.

अभ्यासक्रम

अ. क्र. Sr. No.	घटक Topic	अध्यापन तासिका Teaching Hours	श्रेयांक Credit
विभाग १ Module I	**शब्दशक्ती** ■ शब्दशक्ती म्हणजे काय ? १) **अभिधा**–व्याखा, स्वरूप व प्रकार (योग, रूढी, योगरूढी) २) **लक्षणा** – व्याख्या, स्वरूप ● लक्षणेस आवश्यक गोष्टी अ) मुख्यार्थबाध ब) मुख्यार्थ–लक्ष्यार्थ संबंध क) रूढी व प्रयोजन ● लक्षणेचे महत्त्व ३) **व्यंजना** – व्याख्या, स्वरूप ● व्यंजनेचे मुख्य दोन प्रकार अ) शाब्दी व्यंजना ब) आर्थी व्यंजना ● व्यंजनेचे साहित्यातील महत्त्व	१५	१

विभाग २ Module 2	अ) रसविचार ● रस म्हणजे काय ? ● स्थायिभाव व रस ● भरताचे रससूत्र ब) काव्यानंदमीमांसा ● काव्यानंदमीमांसा म्हणजे काय ? ● कवीचा आनंद १) क्रीडानंद २) निर्मितीचा आनंद ३) आत्माविष्कारानंद ● रसिकाचा आनंद १) ज्ञानानंद २) जिज्ञासापूर्ती ३) पुनःप्रत्ययाचा आनंद ● करुणरसानंद १) केवलानंदवाद २) विरेचन (कॅथार्सिस)	१५	१
घटक ३ Module 3	साहित्याची भाषा १) व्यवहारभाषा, शास्त्रभाषा व साहित्यभाषा : साम्यभेद २) साहित्याचे माध्यम भाषा ३) साहित्य भाषेचे सौंदर्य ४) साहित्य भाषेची विविधता	१५	१
घटक ४ Module IV	छंद व वृत्ते अ) छंद – १) ओवी २) अभंग ३) मुक्तच्छंद ब) वृत्ते – १) भुजंगप्रयात २) वसंततिलका ३) दिंडी (व्याख्या, स्वरूप व उदाहरणे अपेक्षित)	१५	१

❊ प्रश्नपत्रिकेचे स्वरूप व गुणविभागणी ❊

Pattern of Question Paper

एकूण गुण – ४० : Total Marks-40

प्रश्न १	योग्य पर्याय निवडा	०५ गुण
प्रश्न २	अंतर्गत विकल्पासह दीर्घोत्तरी प्रश्न	१५ गुण
प्रश्न ३	अंतर्गत विकल्पासह लघूत्तरी प्रश्न (तीन पैकी दोन)	१० गुण
प्रश्न ४	छंद व वृत्ते (चार पैकी दोन)	१० गुण

सूचना :

१. विभाग चार वर वस्तुनिष्ठ प्रश्न असणार नाहीत.

२. गटप्रकल्पासाठी अंतर्गत मूल्यमापनाकरिता प्रती विद्यार्थ्यास दहा गुण आहेत.

गटप्रकल्प विषय : साहित्यनिर्मितिप्रक्रिया संदर्भात कोणत्याही एका साहित्यिकाची मुलाखत घेणे.

मूलभूत वाचन :

१. जोग, रा. श्री.   *अभिनव काव्यप्रकाश*, व्हीनस प्रकाशन, पुणे, आवृत्ती ७ वी, जानेवारी, १९७५

२. गाडगीळ, स. रा.   *काव्यशास्त्रप्रदीप*, व्हीनस प्रकाशन, पुणे, आवृत्ती ४ थी, जानेवारी, १९९३

३. वाटवे, के. ना.   *रसविमर्श*, नवीन किताबखाना, पुणे, १९४२

४. वाळंबे, मो. रा.   *सुगम मराठी व्याकरण लेखन*, नितीन प्रकाशन, पुणे

५. नेमाडे, भालचंद्र   *साहित्याची भाषा*, साकेत प्रकाशन, औरंगाबाद, आ. दु. १९९८

पूरक वाचन :

१. जोशी, पं. महादेवशास्त्री   *सुलभ काव्यशास्त्र*, एस. जगन्नाथ आणि कं., पुणे

२. उपासे, शिवशंकर   *काव्यशास्त्र परिचय*, फडके प्रकाशन, कोल्हापूर, २०१३

३. जाधव, उदय   *काव्यशास्त्र : आकलन आणि आस्वाद*, लोकपाल पब्लिकेशन, औरंगाबाद,
                                         प्रथमावृत्ती, ५ सप्टेंबर २०१३

४. शिरवाडकर, के. रं.   *साहित्यवेध*, मेहता पब्लिशिंग हाऊस, पुणे, प्रथमावृत्ती, जानेवारी, १९९८

संदर्भ ग्रंथ :

१. कुरुंदकर, नरहर   *रससूत्र*, इंद्रायणी साहित्य, पुणे.

२. सोनार, ब. लु.   *भारतीय साहित्य विचार*, प्रज्ञा, अमळनेर, १९८८

३. मोरे, मोरेश्वर सखाराम   *मराठी व्याकरण*, चित्रशाळा, पुणे, १९७०

४. वासमकर, वि. दा.   *मराठीतील कलावादी समीक्षा*, अक्षरदीप प्रकाशन, कोल्हापूर, आ. प. २०१८

५. तुकदेव, रोहिणी   *ओवी छंद : रूप आणि आविष्कार*, प्रतिमा प्रकाशन, पुणे

६. हिरेमठ, राजशेखर   *मराठी व्याकरण परिचय*, मेहता पब्लिशिंग हाऊस, पुणे, १९८८

७. जाधव, मा. मा.   *अक्षरगाथा (मराठी साहित्यविचार विशेषांक)*, मासिक, नांदेड, एप्रिल, २०१४

शिवाजी विद्यापीठ, कोल्हापूर
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बी.ए. भाग-३ : B.A. Part-III
अभ्यासक्रम : Syllabus
June, 2020 onward
सत्र-६ : Semister No. 6 : अभ्यासपत्रिका क्र. XIII
Discipline Specific Elective (DSE-E127)
विद्याशाखीय विशेष निवड (DSE-E127)
मराठी भाषा व भाषाविज्ञान

उद्दिष्टे :

१. मराठी भाषेची वर्णव्यवस्था समजून घेणे.

२. ध्वनी व अर्थपरिवर्तनाची कारणे व प्रकार यांची माहिती करून घेणे.

३. प्रमाणभाषेचे स्वरूप व विशेष अभ्यासणे.

४. बोलींचे स्वरूप व विशेष समजून घेणे.

५. मराठी भाषेबद्दलची विद्यार्थ्यांची आवड विकसित करणे.

अभ्यासक्रम

अ. क्र. Sr. No.	घटक Topic	अध्यापन तासिका Teaching Hours	श्रेयांक Credit
विभाग १ Module I	मराठीची वर्णमाला • ध्वनी व वर्ण, मराठीची वर्णमाला, पारंपरिक स्वर व त्यांचे वर्गीकरण • स्वरांचे ध्वनिशास्त्रदृष्ट्या व उच्चारण स्थानानुसार विश्लेषण • स्वरांचे प्रकार हस्व, दीर्घ, सिद्ध, साधित, सजातीय, विजातीय • मराठीची स्वर संख्या (पारंपरिक व नवीन) • मराठीतील व्यंजन विचार • व्यंजनांचे प्रकार १. स्पर्श व्यंजने २. कठोर व मृदू व्यंजने ३. अल्पप्राण व महाप्राण ४. अनुनासिके ५. तालव्य व्यंजने ६. अंतःस्थ व्यंजने ७. उष्म व्यंजने ८. संयुक्त व्यंजने ९. मूर्धन्य • मराठीची व्यंजन संख्या (पारंपरिक व नवीन) • मराठीची वर्ण संख्या निश्चितीकरण	१५	१

विभाग २
Module II
	मराठीचे ध्वनिपरिवर्तन
	● भाषेची उच्चारप्रक्रिया
	● ध्वनिपरिवर्तन म्हणजे काय?
	● व्याख्या आणि विशेष
	  निरपवाद, नियमित, अज्ञेय, सार्वत्रिक ध्वनिपरिवर्तन
	● कारणे
	  जित – जेते संबंध, भिन्न भाषिक संबंध, आळस, अनुकरणाची अपूर्णता, वागेंद्रियातील दोष, श्रवणेंद्रियातील दोष, उच्चारशीघ्रता, अज्ञान, आघात, उच्चारसौकर्य, आहार, भौगोलिकता, वर्गसिद्धान्त, लोकभ्रम, सादृश्यता
	● प्रकार
	  अंत्यस्वनलोप, एकस्वनीकरण, आद्यस्वनागम, मध्यस्वनागम, अंत्यस्वनागम, सान्निध परिणाम, समानस्वनलोप, विसदृशीकरण, घोषीकरण, अघोषीकरण, मात्राभेद, सदृशता, अतिशुद्धी, दुष्प्रयोग, स्वनविपर्यय
	● ध्वनिपरिवर्तनाचा मराठी भाषेवरील परिणाम
		१५	१

विभाग ३
Module III
	मराठीचे अर्थपरिवर्तन
	● अर्थपरिवर्तन म्हणजे काय ?
	● व्याख्या आणि स्वरूप
	  अर्थ म्हणजे निर्देश, प्रतिमा, संकल्पना व विचार
	● अर्थपरिवर्तनाची कारणे
	  साम्यतत्त्व, रूपक – लक्षणाजन्य शब्द, बदलते समाजजीवन, अशुभतापरिहार, ग्राम्यतापरिहार, अतिशयोक्ती, शब्दसिद्धी, अतिपरिचयातून सभ्यता, अत्यादरदर्शन, सांस्कृतिक आदान
	● अर्थपरिवर्तनाचे प्रकार –
	  अर्थविस्तार, अर्थसंकोच, अर्थप्रशस्ती, अर्थच्युती, अर्थापकर्ष, अर्थान्तर, अर्थभ्रंश, अर्थादेश, अर्थभेद, अर्थसार
	● अर्थपरिवर्तनाचा मराठी भाषेवरील परिणाम
		१५	१

विभाग ४ Module IV	प्रमाण मराठी भाषा आणि तिच्या बोली ● प्रमाण मराठी : संकल्पना, स्वरूप, विशेष ● बोली : संकल्पना, स्वरूप, विशेष ● मराठीच्या बोली : अहिराणी, वऱ्हाडी, चंदगडी, मालवणी या निवडक बोलींचे स्वरूप व विशेष	१५	१

एकूण गुण – ४० : Total Marks-40

प्रश्न १	योग्य पर्याय निवडा	०५ गुण
प्रश्न २	अंतर्गत विकल्पासह दीर्घोत्तरी प्रश्न	१५ गुण
प्रश्न ३	अंतर्गत विकल्पासह लघूत्तरी प्रश्न (तीन पैकी दोन)	१० गुण
प्रश्न ४	टिपा लिहा (चार पैकी दोन)	१० गुण

सूचना : १. विभाग एकवर वस्तुनिष्ठ प्रश्न असणार नाही.

२. अंतर्गत मूल्यमापनाकरिता सेमिनारसाठी दहा गुण आहेत.

गटप्रकल्प विषय :

१. आपल्या परिसरातील कौटुंबिक, सांस्कृतिक, कृषिविषयक, औद्योगिक क्षेत्रात जी बोलीभाषा बोलली जाते त्या बोलीभाषेतील शब्द, वाक्य, वाक्प्रचार, म्हणी, उखाणे यांचे संकलन आणि विश्लेषणासह गटप्रकल्प अपेक्षित.

२. आपल्या परिसरातील लोककथा, लोकगीते यांचे संकलन करून त्यातील भाषिक विशेषांच्या विश्लेषणावर आधारित गटप्रकल्प अपेक्षित.

मूलभूत वाचन :

१. कुलकर्णी, कृ. पां.   मराठी भाषा : उद्गम आणि विकास, मेहता पब्लिशिंग हाऊस, पुणे

२. कानडे, मु. श्री. (संपा.)   मराठीचा भाषिक अभ्यास, स्नेहवर्धन प्रकाशन, पुणे

३. गजेंद्रगडकर श्री. न.   भाषा आणि भाषाशास्त्र, व्हीनस प्रकाशन, पुणे

४. कुलकर्णी कृ. पां.   शब्द : उद्गम आणि विकास

५. जोगळेकर गं. ना.   अभिनव भाषाविज्ञान, सुविचार प्रकाशन, पुणे

६. जोशी, प्र. न.   सुबोध भाषाशास्त्र, स्नेहवर्धन प्रकाशन, पुणे

७. दामले, मो. के.   शास्त्रीय मराठी व्याकरण, दामोदर सावळाराम आणि मंडळी, पुणे

८. कालेलकर, ना. गो.   ध्वनिविचार, मौज प्रकाशन, मुंबई

९. पोतदार, अनुराधा   मराठीचा अर्थविचार, पुणे विद्यापीठ प्रकाशन, पुणे

१०. कालेलकर, ना. गो.   भाषा आणि संस्कृती, मौज प्रकाशनगृह, मुंबई

११. देवी, गणेश व   भारतीय भाषेचे लोकसर्वेक्षण, पद्मगंधा प्रकाशन, पुणे
जाखडे, अरुण (संपा.)

पूरक वाचन :

१. हिरेमठ, राजशेखर   मराठी व्याकरण परिचय, मेहता पब्लिशिंग हाऊस, पुणे

२. गवळी, अनिल   भाषाविज्ञान आणि मराठी भाषा, हिरण्यकेशी प्रकाशन, कोल्हापूर

३. कुलकर्णी, सुलक्षणा व   भाषाविज्ञान परिचय, फडके प्रकाशन, कोल्हापूर
कुबेर, वसंत

संदर्भ ग्रंथ :

१. पुंडे, द. दि.   सुलभ भाषाविज्ञान, स्नेहवर्धन प्रकाशन, पुणे

२. कदम, महेंद्र   मराठीचे वर्णनात्मक भाषाविज्ञान, स्नेहवर्धन प्रकाशन, पुणे

३. कालेलकर, ना. गो.   भाषा, इतिहास आणि भूगोल, मौज मुंबई

४. शेख, यास्मिन   मराठी लेखन मार्गदर्शिका, राज्य मराठी विकास संस्था, मुंबई

५. हिरेमठ, राजशेखर   मराठी व्याकरण परिचय, मेहता पब्लिशिंग हाऊस, पुणे

६. लामतुरे, प्रज्ञा   ग्रामीण बोलीभाषेचे वैभव, संस्कृती प्रकाशन, पुणे

७. जंबाले, विठ्ठल   ग्रामीण कादंबरी : मराठवाडी बोलीचे स्वरूप, चिन्मय प्रकाशन, औरंगाबाद

८. पाटील, व्ही. एन.   सुलभ भाषाविज्ञान, प्रशांत पब्लिकेशन्स, जळगाव, २०१६

९. भांड, बाबा व मगर, राजेंद्र   भाषा आणि साहित्य : माझी भूमिका : सयाजीराव गायकवाड, महाराजा सयाजीराव गायकवाड संशोधन व प्रशिक्षण संस्था, औरंगाबाद

१०. केळकर, तन्मय (अनु.)   पंजाबच्या भाषा आणि लिपीची समस्या : शहीद भगतसिंग, प्रका. भाषाविकास संशोधन संस्था, कोल्हापूर

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Board of Studies in Marathi
पसंतीवर आधारित श्रेयांक पद्धती
Choice Based Credit System
बी.ए. भाग-३ : B.A. Part-III
अभ्यासक्रम : Syllabus
June, 2020 onward
सत्र-६ : Semister No. 6 : अभ्यासपत्रिका क्र. XIV
Discipline Specific Elective (DSE-E128)
विद्याशाखीय विशेष निवड (DSE-E128)
मध्ययुगीन मराठी वाङ्मयाचा इतिहास (इ.स.१५०० ते इ.स.१८००)

उद्दिष्टे :

१. मध्ययुगीन मराठी वाङ्मयाचा कालिक अभ्यास करणे.

२. मध्ययुगीन मराठी वाङ्मयाचा स्थूल परिचय करून घेणे.

३. पंडित कवी व त्यांची रचना यांचा परिचय करून घेणे.

४. बखर वाङ्मय आणि शाहिरी वाङ्मय यांचे स्वरूप, विशेष अभ्यासणे.

५. मध्ययुगीन मराठी गद्य, पद्य रचनेचे विशेष अभ्यासणे.

अभ्यासक्रम

अ. क्र. Sr. No.	घटक Topic	अध्यापन तासिका Teaching Hours	श्रेयांक Credit
विभाग १ Module I	इ. स. १५०० ते इ.स. १६०० एकनाथांची साहित्य संपदा चतुःश्लोकी भागवत, एकनाथी भागवत, भावार्थ रामायण, गवळणी, भारुडे इत्यादी रचना	१५	१
विभाग २ Module II	इ. स. १६०० ते इ. स. १७०० (स्थूल कालखंड) अ) तुकारामांची अभंगरचना ब) रामदासांची ग्रंथरचना करुणाष्टके, रामायणे, मनाचे श्लोक, दासबोध, स्फुट प्रकरणे	१५	१
विभाग ३ Module III	इ. स. १६०० ते इ. स. १८०० (स्थूल कालखंड) निवडक पंडित कवींच्या काव्याचा अभ्यास १) मुक्तेश्वर २) वामन पंडित ३) रघुनाथ पंडित ४) श्रीधर ५) मोरोपंत	१५	१
विभाग ४ Module IV	इ. स. १५०० ते इ.स. १८०० (स्थूल कालखंड) अ) बखर वाङ्मय शिवपूर्वकालीन बखरी, शिवकालीन बखरी, पेशवेकालीन बखरी–स्वरूप, विशेष ब) शाहिरी वाङ्मय (लावणी व पोवाडा) १) अनंत फंदी २) परशराम ३) राम जोशी ४) प्रभाकर ५) होनाजी बाळा	१५	१

❉ प्रश्नपत्रिकेचे स्वरूप व गुणविभागणी ❉
Pattern of Question Paper

एकूण गुण – ४० : Total Marks-40

प्रश्न १	योग्य पर्याय निवडा	०५ गुण
प्रश्न २	अंतर्गत विकल्पासह दीर्घोत्तरी प्रश्न	१५ गुण
प्रश्न ३	अंतर्गत विकल्पासह लघूत्तरी प्रश्न (तीन पैकी दोन)	१० गुण
प्रश्न ४	टिपा लिहा (चार पैकी दोन)	१० गुण

सूचना : १. गटप्रकल्पासाठी अंतर्गत मूल्यमापनाकरिता प्रती विद्यार्थ्यास दहा गुण आहेत.

गटप्रकल्प विषय :

❉ आपल्या परिसरातील कोणत्याही ग्रंथालयातील किंवा ग्रंथालयाबाहेरील मध्ययुगीन मराठी ग्रंथकार आणि ग्रंथ यांची सूची तयार करावी.

❉ मध्ययुगीन मराठी वाङ्मयातील निवडक शब्दांचा शब्दसंग्रह करणे आणि त्यांचे वर्गीकरण व विश्लेषण करणे.

मूलभूत वाचन :

१. नसिराबादकर, ल. रा. — प्राचीन मराठी वाङ्मयाचा इतिहास, फडके प्रकाशन, कोल्हापूर

२. देशपांडे, अ. ना. — प्राचीन मराठी वाङ्मयाचा इतिहास खंड १ ते ४, व्हीनस प्रकाशन, पुणे

३. पांगारकर, ल. रा. — प्राचीन मराठी वाङ्मयाचा इतिहास खंड १ ते ३, महाराष्ट्र साहित्य परिषद, पुणे

४. मंचरकर, र. बा. — धर्म संप्रदाय आणि मध्ययुगीन मराठी वाङ्मय, प्रतिमा प्रकाशन, पुणे

५. गवळी, अनिल — सर्वात्मभावी तुकाराम, सायन पब्लिकेशन प्रा. लि. पुणे

६. सपकाळे, प्रकाश — संत तुकाराम, प्रशांत पब्लिकेशन्स, जळगाव

७. वाटवे, के. ना. (संपा.) — प्राचीन मराठी पंडिती काव्य.

८. फाटक, न. र. — श्री एकनाथ वाङ्मय दर्शन आणि कार्य, मौज प्रकाशन गृह, मुंबई

९. सरदेशमुख, त्र्यं. वि. — रामदास : प्रतिमा आणि बोध, अस्मिता प्रकाशन, पुणे

१०. हेरवाडकर, र. वि. — मराठी बखर, व्हीनस प्रकाशन, पुणे

११. अदवंत, म. ना. — पैंजण, साहित्य प्रसार केंद्र, नागपूर

१२. सहस्रबुद्धे, म. ना. — मराठी शाहिरी वाङ्मय, ठोकळ प्रकाशन, पुणे

१३. खरात, महेश (संपा.) — लोकसाहित्य : जीवन आणि संस्कृती,(प्रा.विश्वनाथ शिंदे गौरवग्रंथ), सायन पब्लिकेशन, पुणे

पूरक वाचन :

१. तुळपुळे, शं. गो. (संपा.) — मध्ययुगीन मराठी वाङ्मयाचा इतिहास, म. सा. प., पुणे

२. तुळपुळे , शं. गो. (संपा.) — मराठी वाङ्मयाचा इतिहास, महाराष्ट्र साहित्य परिषद, पुणे

३. उपासे, शिवशंकर — मराठी काव्यातील शिवदैवत दर्शन, आख्यानकाव्य व स्फुटकाव्य : १३ ते १८ वे शतक, शैवभारती शोध प्रतिष्ठान, जंगमवाडी मठ, वाराणसी

४. पाटील, तानाजी — संत साहित्यातील सामाजिकता, विश्वकर्मा प्रकाशन, पुणे

५. हेरवाडकर, र. वि. — मराठी बखर

संदर्भ ग्रंथ :

१. बडवे, सतीश — मध्ययुगीन साहित्याविषयी, मीरा, औरंगाबाद

२. फाटक, न. र. — श्री. रामदास, वाङ्मय आणि कार्य

३. माटे, श्री. म. — संत, पंत आणि तंत, ठोकळ प्रकाशन, पुणे

४. होनमाने, धनंजय — तंजावरची मराठी कीर्तनपरंपरा, स्नेहवर्धन, पुणे

५. होनमाने, धनंजय — पंत प्रतिनिधींची कीर्तनाख्याने, दर्या प्रकाशन, पुणे

६. ग्रामोपाध्ये, गं. ब. — मराठी बखर गद्या, व्हीनस बुक स्टॉल, पुणे

७. शिंदे, विश्वनाथ — शाहिरी वाङ्मयाच्या धारा, प्रतिमा प्रकाशन, पुणे

७. केलकर, य. न. — मराठी शाहीर आणि शाहिरी वाङ्मय, पुणे विद्यापीठ, पुणे

९. मोरजे, गंगाधर — मऱ्हाटी लावणी वाङ्मय, मोघे प्रकाशन, कोल्हापूर

१०. वर्दे, श्री. म. — मराठी कवितेचा उष:काल किंवा मराठी शाहीर,मुंबई मराठी साहित्य संघ,मुंबई

मराठी अभ्यास मंडळ

Board of Studies in Marathi

पसंतीवर आधारित श्रेयांक पद्धती

Choice Based Credit System

बी.ए. भाग-३ : B.A. Part-III

अभ्यासक्रम : Syllabus

June, 2020 onward

सत्र-६ : Semister No. 6 : अभ्यासपत्रिका क्र. XV

Discipline Specific Elective (DSE-E129)

विद्याशाखीय विशेष निवड (DSE-E129)

मराठी भाषा व अर्थार्जनाच्या संधी

पाठ्यपुस्तक : मराठी भाषा व अर्थार्जनाच्या संधी (संपादन)

शिवाजी विद्यापीठ प्रकाशन, कोल्हापूर

उद्दिष्टे :

१. प्रसारमाध्यमांतील अर्थार्जनाच्या संधी आणि भाषिक कौशल्ये यांचा परिचय करून घेणे.

२. स्पर्धा परीक्षांमध्ये मराठी भाषा विषयाचे महत्त्व समजून घेणे.

३. उद्योग व सेवा क्षेत्रात मराठी भाषेद्वारे अर्थार्जनप्राप्ती संदर्भात ज्ञान संपादन करणे.

४. मुद्रित शोधनाची पद्धत अभ्यासणे.

अभ्यासक्रम

अ. क्र. Sr. No.	घटक Topic	अध्यापन तासिका Teaching Hours	श्रेयांक Credit

विभाग १
Module I
	प्रसारमाध्यमांतील अर्थार्जनाच्या संधी व भाषिक कौशल्ये
	■ मुद्रित माध्यमे (Print Media)
	   १. संपादन २. स्तंभलेखन ३. जाहिरात लेखन
	   ४. शब्दांकन (नावीण्यपूर्ण उपक्रम, व्यक्तींचे अनुभव व मानपत्र)
	■ आकाशवाणी
	   १. निवेदन २. संहिता लेखन (कृषी, महिला व शैक्षणिक विषयक)
	   ३. बातमी लेखन
	■ चित्रवाणी
	   १. निवेदन २. संहिता लेखन (साहित्य, युवा व मनोरंजन विषयक)
	   ३. बातमी लेखन
		१५	१

विभाग २ Module II	उद्योग व सेवाक्षेत्रातील अर्थार्जनाच्या संधी व भाषिक कौशल्ये ■ उद्योग व सेवाक्षेत्र आणि मराठी भाषा ■ उद्योग व सेवाक्षेत्रातील अर्थार्जन संधी – १. विपणन (Marketing) साठी संवाद कौशल्ये २. ग्राहक सेवा केंद्र (Call Centers) ३. अनुवाद ४. मराठी टंकलेखन, युनिकोड व पीपीटी (Power Point Presentation) परिचय	१५	१
विभाग ३ Module III	मुद्रितशोधन १. मुद्रितशोधन : संकल्पना, स्वरूप, प्रकार व महत्त्व २. महाराष्ट्र शासनाचे प्रमाणलेखनविषयक १८ नियम, अपवाद, उदाहरणे, विरामचिन्हे ३. मुद्रित शोधनाची पद्धत : सांकेतिक खुणा, त्याचे स्पष्टीकरण, पहिले वाचन व पुढील मुद्रितशोधन, संगणकीय मुद्रितशोधन ४. मुद्रितशोधनाचे प्रात्यक्षिक कार्य :वर्तमानपत्र, नियतकालिक, ग्रंथ, छापील मजकूर, लेख इ.	१५	१
विभाग ४ Module IV	स्पर्धा परीक्षांसाठी मराठी १. स्पर्धा परीक्षांचे स्वरूप : सरळसेवा, कम्बाईन, राज्यसेवा, संघ लोकसेवा आयोग २. स्पर्धा परीक्षांमधील मराठीचे स्वरूप : अभ्यासक्रम परिचय ३. स्पर्धा परीक्षेसाठी कौशल्ये : वाचन, नोट्स (टिपणे), लेखन, हस्ताक्षर, वेळेचे व्यवस्थापन, गटचर्चा,संदर्भ साहित्य ४. मुलाखतीची पूर्वतयारी व तंत्रे (मुलाखत कशी द्यावी)	१५	१

❖ प्रश्नपत्रिकेचे स्वरूप व गुणविभागणी ❖

Pattern of Question Paper

एकूण गुण – ४० : Total Marks-40

प्रश्न १	योग्य पर्याय निवडा	०५ गुण
प्रश्न २	अंतर्गत विकल्पासह दीर्घोत्तरी प्रश्न	१५ गुण
प्रश्न ३	अंतर्गत विकल्पासह लघूत्तरी प्रश्न (तीन पैकी दोन)	१० गुण
प्रश्न ४	टिपा लिहा (चार पैकी दोन)	१० गुण

सूचना : १. गटप्रकल्पासाठी अंतर्गत मूल्यमापनाकरिता प्रती विद्यार्थ्यास दहा गुण आहेत.

गटप्रकल्प विषय :

१. राष्ट्रीय, शैक्षणिक, सांस्कृतिक, सामाजिक, कृषी, आरोग्य, भाषा व साहित्य क्षेत्रातील ताज्या घडामोडी यापैकी एका विषयावर आकाशवाणी किंवा चित्रवाणीसाठी संहितालेखन.

२. उद्योग व सेवाक्षेत्रे आणि प्रसारमाध्यमे यांना भेटी देऊन तेथील भाषिक उपयोजनावर आधारित प्रकल्प तयार करणे.

मूलभूत वाचन :

१. काणे, पुष्पा	नभोवाणी कार्यक्रम : तंत्र आणि मंत्र, इंडिया बुक कंपनी, पुणे
२. भागवत, यशोदा	बोलका कॅमेरा, मौज प्रकाशन, पुणे
३. राजाध्यक्ष, विजया (संपा.)	मराठी वाङ्मय कोश, साहित्य आणि संस्कृती मंडळ, मुंबई
४. मोरे, सदानंद व लिंबाळे, शरणकुमार	प्रबोधनपर वैचारिक वाङ्मय, य. च. म. मु. विद्यापीठ, नाशिक
५. रेगे, मे. पुं. व इतर	मराठी विचारवंत आणि आपण, मौज प्रकाशन गृह, मुंबई
६. शेख, यास्मिन	मराठी लेखन मार्गदर्शिका, राज्य मराठी विकास संस्था, मुंबई
७. फडके, अरुण	मराठी लेखन–कोश, अंकुर प्रकाशन, ठाणे
८. धायगुडे, य. ए.	मुद्रितशोधन, दि पूना प्रेस ओनर्स असो. लि. पुणे
९. खोपकर, अरुण	चित्रव्यूह, लोकवाङ्मय गृह, प्रकाशन, मुंबई
१०. वरखेडे, रमेश	सायबर संस्कृती, इन्स्टिट्यूट ऑफ नॉलेज इंजिनिअरिंग, नाशिक
११. कांबळे, अमर	स्पर्धा परीक्षेला सामोरे जाताना, निर्मिती संवाद प्रकाशन, कोल्हापूर
१२. कांबळे, अमर	मुलाखत कौशल्य, निर्मिती संवाद प्रकाशन, कोल्हापूर

पूरक वाचन :

१. कुंभार, प्रकाश	उपयोजित भाषाविज्ञान आणि प्रसारमाध्यमे, अक्षरदालन, कोल्हापूर
२. जोशी, प्रभाकर	उपयोजित मराठी, प्रशांत पब्लिकेशन्स, जळगाव
३. तौर, पृथ्वीराज	मराठी भाषिक कौशल्ये विकास, अथर्व पब्लिकेशन्स, धुळे
४. फडके, अरुण	शुद्धलेखन मार्गप्रदीप, अंकुर प्रकाशन, ठाणे
५. दीक्षित, विजय	चित्रपट : एक कला, रेणुका प्रकाशन, नाशिक
६. इनामदार, एस. डी.	माध्यम, एस. डी. प्रकाशन, पुणे

संदर्भ ग्रंथ :

१. देशपांडे, वि. भा. व जोगळेकर, सुषमा (संपा.)	मराठी कलाभिरुची, कॉन्टिनेन्टल प्रकाशन, पुणे
२. पर्चिंद्रे, श्रीराम	मुलाखत आणि शब्दांकन, अनुबंध प्रकाशन, पुणे
३. ढोले, विश्राम	प्रसारमाध्यमे आणि प्रयोगकला, लोकवाङ्मय गृह, मुंबई
४. शिंदे, अरुण	सत्यशोधकीय नियतकालिके, कृष्णा संशोधन व विकास अकादमी, मंगळवेढा
५. जोशी, प्रभाकर व वले, वासुदेव	उपयोजित मराठी, प्रशांत पब्लिकेशन्स, जळगाव
६. रेगे, मे. पुं. (संपा.)	नवभारत (मासिक), व्यावहारिक मराठी विशेषांक, प्राज्ञ पाठशाळा मंडळ, वाई (ऑगस्ट–सप्टेंबर १९८१)
७. भालके, रामचंद्र व इतर	प्रबोधनपर साहित्य : स्वरूप आणि संकल्पना, य.च.म.मु. विद्यापीठ, नाशिक
८. चपळगावकर, नरेंद्र	मराठीतील वैचारिक साहित्य : लेखक आणि समाज, नवभारत, जून २०१६ वर्ष २९, अंक ९
९. चौसाळकर, अशोक	विचारवंत आणि समाज, युनिक अॅकॅडमी, पुणे
१०. गावडे, गोपाळ	मामा वरेरकर : प्रयोगाची नांदी, मनोकामना प्रकाशन, इस्लामपूर, २०१७
११. कांबळे, विनोद	सर्जननोंदी, वाचनकट्टा प्रकाशन, प्रा. लि., कोल्हापूर, २०१९

शिवाजी विद्यापीठ, कोल्हापूर
SHIVAJI UNIVERSITY, KOLHAPUR
मराठी अभ्यास मंडळ
Board of Studies in Marathi
पसंतीवर आधारित श्रेयांक पद्धती
Choice Based Credit System
बी.ए. भाग-३ : B.A. Part-III
अभ्यासक्रम : Syllabus
June, 2020 onward
सत्र-६ : Semister No. 6 : अभ्यासपत्रिका क्र. XVI
Discipline Specific Elective (DSE-E-130)
विद्याशाखीय विशेष निवड (DSE-E-130)

वाङ्मय प्रकाराचे अध्ययन : ललित गद्य (व्यक्तिचित्रे)

पाठ्यपुस्तक : मुलखावेगळी माणसं (संपादन)

शिवाजी विद्यापीठ प्रकाशन, कोल्हापूर

उद्दिष्टे :

१. ललित गद्य वाङ्मयप्रकाराचे स्वरूप अभ्यासणे.

२. व्यक्तिचित्र संकल्पना व स्वरूप समजून घेणे.

३. प्रवाहानुरूप मराठीतील व्यक्तिचित्रांचे स्वरूप अभ्यासणे.

४. 'मुलखावेगळी माणसं'मधील व्यक्तिविशेषांचे आकलन करून घेणे.

५. 'मुलखावेगळी माणसं'मधील शैक्षणिक,सामाजिक,सांस्कृतिक,राजकीय पर्यावरण आणि कौटुंबिक भावविश्व अभ्यासणे.

६. 'मुलखावेगळी माणसं'मधील ग्रामीण व उपेक्षितांच्या जीवनाचे आकलन करून घेणे.

७. 'मुलखावेगळी माणसं'मधील अभिव्यक्ती, निवेदनशैली व भाषाविशेष अभ्यासणे.

अभ्यासक्रम

अ. क्र. Sr. No.	घटक Topic	अध्यापन तासिका Teaching Hours	श्रेयांक Credit
विभाग १ Module I	ललित गद्य : संकल्पना व स्वरूप व्यक्तिचित्रे : संकल्पना, स्वरूप/वैशिष्ट्ये आणि वाटचाल व्यक्तिचित्र लेखनासाठी आवश्यक गुण	१५	१
विभाग २ Module II	१. रामा मैलकुली – व्यंकटेश माडगूळकर २. मृत्यूचे चुंबन घेणारा महाकवी – प्र. के. अत्रे ३. निळू मांग – अण्णाभाऊ साठे ४. मोरणी – विभावरी शिरूरकर	१५	१
विभाग ३ Module III	५. जमीला जावद – हमीद दलवाई ६. यंकटअण्णा – व. वा. बोधे ७. दगडूमामा – उत्तम कांबळे ८. मुंबईचा चित्रकार – अरुण खोपकर	१५	१
विभाग ४ Module IV	९. हीरा – इंद्रजित भालेराव १०. बाबा मास्तर – दि. बा. पाटील ११. दादासाहेब वस्ताद – सयाजीराजे मोकाशी १२. डोकेवाला संशोधक : दादाजी रामजी खोब्रागडे – व्ही.एन.शिंदे	१५	१

Pattern of Question Paper

एकूण गुण – ४० : Total Marks-40

प्रश्न १	योग्य पर्याय निवडा	०५ गुण
प्रश्न २	अंतर्गत विकल्पासह दीर्घोत्तरी प्रश्न	१५ गुण
प्रश्न ३	अंतर्गत विकल्पासह लघूत्तरी प्रश्न (तीन पैकी दोन)	१० गुण
प्रश्न ४	टिपा लिहा (चार पैकी दोन)	१० गुण

सूचना :

१. विभाग एक वर वस्तुनिष्ठ प्रश्न असणार नाहीत.

२. गटप्रकल्पासाठी अंतर्गत मूल्यमापनाकरिता प्रती विद्यार्थ्यास दहा गुण आहेत.

गटप्रकल्प विषय :

आपल्या परिसरातील शैक्षणिक, सामाजिक, सांस्कृतिक, कला, क्रीडा, आरोग्य, राजकीय इत्यादी समाजजीवनाच्या कोणत्याही क्षेत्रातील व्यक्तींची व्यक्तिचित्रे लिखित स्वरूपात प्रती प्रकल्पनुरूप ५ (किमान एका प्रकल्पकास एक नुसार) तयार करून ती एकत्रित जमा करावीत.

मूलभूत वाचन :

१. वास्कर, आनंद (संपा.)	वाङ्मयप्रकार संकल्पना (डॉ.विजय निंबाळकर गौरवग्रंथ), अन्वय प्रकाशन,पुणे
२. चौघुले, वि. शं.	मुक्तगद्य : संकल्पना आणि उपयोजन, मॅजेस्टिक प्रकाशन, मुंबई, २००८
३. शिंदे, रणधीर	ललित गद्य ते मुक्तगद्य (लेख), दै. महाराष्ट्र टाईम्स, २९-१२-२०१३
४. मालशे, मिलिंद	साहित्य प्रकाराची संकल्पना (लेख), साहित्य : अध्यापन आणि प्रकार, (संपा.) श्री. पु. भागवत, सुधीर रसाळ, मौज प्रकाशन, मुंबई, १९८७
५. हातकणंगलेकर, जहागीरदार, पवार, गो. मा.	मराठी साहित्य : प्रेरणा आणि स्वरूप, पॉप्युलर प्रकाशन, मुंबई, १९८६
६. पुरोहित, के. ज.	लघुनिबंध, साहित्य अकादमी, नवी दिल्ली

पूरक वाचन :

१. माडगूळकर, व्यंकटेश	माणदेशी माणसं, मेहता पब्लिशिंग हाऊस, पुणे, पुनर्मुद्रण, २०१८
२. अत्रे, प्र. के.	मृत्यूचे चुंबन घेणारा महाकवी : साने गुरूजी, पार्श्व पब्लिकेशन, कोल्हापूर,१९६२
३. साठे, अण्णाभाऊ	बरबाढ्या कंजारी, श्रमिक प्रतिष्ठान, कोल्हापूर, लोकावृत्ती, २०१०
४. शिरूरकर, विभावरी	दोघांचे विश्व आणि इतर काही कथा, कॉन्टिनेन्टल प्रकाशन, पुणे, १९५७
५. दलवाई, हमीद	जमीला जावद आणि इतर कथा, साधना प्रकाशन, पुणे, २०१६
६. बोधे, व. वा.	गावाकडची माणसं, अक्षरबंध प्रकाशन, पुणे, २००७
७. कांबळे, उत्तम	कावळे आणि माणसं, मनोविकास प्रकाशन, पुणे, आ.दु., २०१०
८. खोपकर, अरुण	चित्रव्यूह, लोकवाङ्मय गृह, मुंबई
९. भालेराव, इंद्रजित	गाई घरा आल्या, प्रतिभास प्रकाशन, परभणी
१०. पाटील, दि. बा.	भली माणसं, मनोकामना प्रकाशन, इस्लामपूर, २०१३
११. मोकाशी, सयाजीराजे	पंधरा ऑगस्ट, मुक्तरंग प्रकाशन, लातूर, २०१६
१२. शिंदे, व्ही. एन.	हिरव्या बोटांचे किमयागार, तेजस प्रकाशन, कोल्हापूर, २०१९

संदर्भ ग्रंथ :

१. जोशी, प्र. न.	मराठी वाङ्मयाचा विवेचक इतिहास, अर्वाचीन काल (१८०० ते १९८०), स्नेहवर्धन प्रकाशन, पुणे
२. भागवत, श्री. पु.	साहित्य अध्यापन आणि प्रकार (प्रा. वा. ल. कुलकर्णी गौरवग्रंथ), मौज प्रकाशन गृह, मुंबई

SHIVAJI UNIVERSITY, KOLHAPUR.

Accredited By NAAC with 'A' Grade

Revised Syllabus For

B.A. Part-III

Hindi.

Syllabus to be implemented from

June, 2020 onwards.

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हिंदी अध्ययन मंडल

जून 2020 से लागू

हिंदी स्पेशल बी.ए.–**3** (कला)

सत्र–V, VI

Discipline Specific Elective

(शैक्षिक वर्ष –2020–21, 2021–22, 2022–23)

प्रस्तुत पाठ्यक्रम का निर्माण विश्वविद्यालय अनुदान आयोग, नई दिल्ली की मॉडल पाठ्यचर्या (**CBCS**) के आलोक में किया गया है।

सत्र–V

प्रश्नपत्र– VII	: विधा विशेष का अध्ययन।
प्रश्नपत्र– VIII	: साहित्यशास्त्र ।
प्रश्नपत्र– IX	: हिंदी साहित्य का इतिहास।
प्रश्नपत्र– X	: प्रयोजनमूलक हिंदी ।
प्रश्नपत्र– XI	: भाषा विज्ञान और हिंदी भाषा ।

सत्र–VI

प्रश्नपत्र– XII	: विधा विशेष का अध्ययन।
प्रश्नपत्र– XIII	: साहित्यशास्त्र और हिंदी आलोचना।
प्रश्नपत्र– XIV	: हिंदी साहित्य का इतिहास।
प्रश्नपत्र– XV	: प्रयोजनमूलक हिंदी ।
प्रश्नपत्र– XVI	: भाषा विज्ञान और हिंदी भाषा ।

सत्र V और VI : परीक्षा में एक प्रश्नपत्र 50 अंकों का होगा, जिसमें 40 अंक लिखित परीक्षा के और 10 अंक अंतर्गत मूल्याकंन के लिए है। जिसमें सेमिनार, मौखिकी, परियोजना, (प्रोजेक्ट) गृहकार्य, में से एक देना अनिवार्य है।

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सत्र –V प्रश्नपत्र– VII

विधा विशेष का अध्ययन

Discipline Specific Elective (D.S.E.-E6)

(शैक्षिक वर्ष –2020 –21, 2021–22, 2022–23)

प्रस्तुत पाठ्यक्रम का निर्माण विश्वविद्यालय अनुदान आयोग, नई दिल्ली की मॉडल पाठ्यचर्या (**CBCS**) के आलोक में किया गया है।

पाठ्यक्रम

उद्देश्य :

1.नाटककार कुसुम कुमार की बहुमुखी प्रतिभा से परिचित कराना।

2.नाटककार कुसुम कुमार के साहित्य से परिचित कराना।

3.नाटककार कुसुम कुमार की विचारधारा से परिचित कराना।

4.नाटककार कुसुम कुमार के निर्धारित ग्रंथ का सूक्ष्म आलोचनात्मक अध्ययन कराना।

5.लेखिका के नाटककार के रूप में साहित्यिक स्थान को निर्धारित कराना।

अध्यापन पद्धति

- स्वाध्याय .

- व्याख्यान, विवेचन तथा विश्लेषण

- संगोष्ठी तथा समूह चर्चा का आयोजन।

- अतिथियों एवं विद्वानों के व्याख्यान।

- दृक श्राव्य माध्यमों का प्रयोग।

- संगणक तथा इंटरनेट आदि साधनों का प्रयोग।

पाठ्यपुस्तक

'दिल्ली ऊँचा सुनती है' (नाटक) –कुसुम कुमार

किताबघर प्रकाशन, अन्सारी रोड, दरियागंज,

नई दिल्ली–110002

इकाई 1 कुसुम कुमार का जीवन परिचय, व्यक्तित्व, कृतित्व एवं नाटककार कुसुम कुमार का सामान्य परिचय ।

इकाई 2 'दिल्ली ऊँचा सुनती है'– कथावस्तु एवं शीर्षक की सार्थकता।

इकाई 3 'दिल्ली ऊँचा सुनती है'– पात्र एवं चरित्र –चित्रण, संवाद, देशकाल वातावरण।

इकाई 4 'दिल्ली ऊँचा सुनती है'– भाषा शैली, उद्देश्य अभिनेयता एवं समस्याएँ।

प्रश्नपत्र का स्वरूप एवं अंक विभाजन		अंक
प्रश्न 1	पूरे पाठ्यक्रम पर दस बहुविकल्पी प्रश्न	10
प्रश्न 2	'दिल्ली ऊँचा सुनती है' पर ससंदर्भ प्रश्न (3 में से 2)	10
प्रश्न 3	'दिल्ली ऊँचा सुनती है' एवं कुसुम कुमार पर लघुत्तरी प्रश्न (3 में से 2)	10
प्रश्न 4	'दिल्ली ऊँचा सुनती है' पर दीर्घोत्तरी प्रश्न (अंतर्गत विकल्प के साथ)	10

संदर्भ ग्रंथ सूची–

- डॉ. कुसुम कुमार एक प्रयोगधर्मी नाटककार– डॉ.दत्तात्रय मोहिते, विद्या प्रकाशन, 'सी' 449, गुजैनी, कानपुर–208022

- स्वांत्र्योत्तर हिंदी नाटक–डॉ.रंजन तिवारी, विद्या प्रकाशन, कानपुर–208022

- हिंदी महिला नाटककार–डॉ.भगवान जाधव, विद्या प्रकाशन, कानपुर–208022

- समकालीन हिंदी नाटक– डॉ. जशवंतभाई पंडया, ज्ञान प्रकाशन, कानपुर

शिवाजी विश्वविद्यालय, कोल्हापुर

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सत्र –V प्रश्नपत्र– VIII

साहित्यशास्त्र

Discipline Specific Elective (D.S.E.-E7)

(शैक्षिक वर्ष –2020 –21, 2021–22, 2022–23)

प्रस्तुत पाठ्यक्रम का निर्माण विश्वविद्यालय अनुदान आयोग, नई दिल्ली की मॉडल पाठ्यचर्या (CBCS) के आलोक में किया गया है।

उद्देश्य :

1) साहित्य निर्मिति की प्रक्रिया का बोध कराना।

2) साहित्य / काव्य के विभिन्न अंगों, भेदों से परिचित कराना।

3) साहित्य / काव्य की नवीन विधाओं से परिचित कराना।

4) समीक्षा सिद्धांतों से परिचित कराना।

5) साहित्य / काव्य के तत्वों से परिचित कराना।

6) अलंकारों से परिचित कराना।

अध्यापन पद्धति –

- स्वाध्याय .

- व्याख्यान, विवेचन तथा विश्लेषण

- भारतीय एवं पाश्चात्य साहित्यशास्त्र का सैद्धांतिक एवं अनुप्रयोग की दृष्टि से।

- संगोष्ठी तथा समूह चर्चा का आयोजन।

- अतिथियों एवं विद्वानों के व्याख्यान।

- दृक श्राव्य माध्यमों का प्रयोग।

- संगणक तथा इंटरनेट आदि साधनों का प्रयोग।

अध्ययनार्थ विषय –

इकाई 1 काव्य/साहित्य – स्वरूप, तत्व, प्रयोजन।

इकाई 2 काव्य के प्रकार, काव्य गुण, काव्य दोष।

इकाई 3 रस – स्वरूप, रस के अंग, रस के भेद।

इकाई 4 अलंकार – शब्दालंकार –अनुप्रास, वक्रोक्ति, यमक, वीप्सा

अर्थालंकार – उपमा, रूपक, अतिशयोक्ति, विभावना।

(केवल लक्षण एवं उदाहरण अपेक्षित)

प्रश्नपत्र का स्वरूप एवं अंक विभाजन		अंक 40
प्रश्न 1	पूरे पाठ्यक्रम पर दस बहुविकल्पी प्रश्न	10
प्रश्न 2	इकाई 2 पर लघुत्तरी प्रश्न (3 में से 2)	10
प्रश्न 3	इकाई 4 पर टिप्पणियां (3 में से 2)	10
प्रश्न 4	इकाई 1 और 3 पर दीर्घोत्तरी प्रश्न (अंतर्गत विकल्प के साथ)	10

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सत्र V प्रश्नपत्र IX

हिंदी साहित्य का इतिहास

Discipline Specific Elective (D.S.E.-E8)

(शैक्षिक वर्ष –2020 –21, 2021–22, 2022–23)

प्रस्तुत पाठ्यक्रम का निर्माण विश्वविद्यालय अनुदान आयोग, नई दिल्ली की मॉडल पाठ्यचर्या (CBCS) के आलोक में किया गया है।

उद्देश्य :

1. हिंदी भाषा तथा साहित्य की विकास यात्रा से अवगत कराना।

2. हिंदी साहित्य की विकास यात्रा में हिंदी भाषा के माध्यम से अलग–अलग विचारधारा और प्रवृत्तियों से अवगत कराना।

3. छात्रों में साहित्य समझने तथा उसका आस्वादन, मूल्यांकन करने की दृष्टि को बढाना।

4. छात्रों को साहित्य के संदर्भ में विभिन्न साहित्यिक विधाओं के विकास क्रम से परिचित कराना।

5. छात्रों को युगीन सामाजिक, राजनीतिक परिस्थितियों के परिप्रेक्ष्य में हिंदी से अवगत कराना।

6. इतिहासकारों द्वारा प्रस्तुत काल विभाजन और नामकरण को जानने के लिए प्रेरित करना।

7. हिंदी के प्रमुख संत कवि, उनकी रचनाएँ और उनका समाजसुधार में योगदान से परिचित कराना।

8. हिंदी साहित्य के अंतर्गत गद्य–पद्य विधा और उसके भेदों, उपभेदों से अवगत कराना।

9. आदिकाल से लेकर आधुनिक काल तक के संत, महात्मा, लेखक, कवियों की विचारधारा और उनके द्वारा निर्मित साहित्य का सामान्य परिचय कराना।

अध्यापन पद्धति

- स्वाध्याय .
- व्याख्यान, विवेचन तथा विश्लेषण ।
- संगोष्ठी तथा समूह चर्चा का आयोजन।
- अतिथियों एवं विद्वानों के व्याख्यान।
- दृक श्राव्य माध्यमों का प्रयोग।
- संगणक तथा इंटरनेट आदि साधनों का प्रयोग।

अध्ययनार्थ विषय –

इकाई – 1 आदिकाल –

1. आदिकाल का नामकरण।
2. सामाजिक और राजनीतिक परिस्थितियाँ।
3. आदिकाल की प्रतिनिधि रचनाएँ: सामान्य परिचय –

अ) पृथ्वीराज रासो।

आ) बीसलदेव रासो।

इकाई – 2 . भक्तिकाल–

1. भक्तिकालीन सामाजिक परिस्थितियाँ।
2. भक्तिकालीन राजनीतिक परिस्थितियाँ।
3. भक्तिकालीन कवियों का सामान्य परिचय–

    अ) संत नामदेव

    आ) संत रविदास

    इ) संत मीराबाई

    ई) गुरू नानक

इकाई – 3 . निर्गुण भक्ति धारा–

1. निर्गुण भक्ति धारा काव्य की सामान्य विशेषताएँ।
2. कबीर : जीवन परिचय एवं कृतित्व।

3. जायसी : जीवन परिचय एवं कृतित्व।

इकाई – 4 . सगुण भक्ति धारा–

1. सगुण भक्ति धारा काव्य की विशेषताएँ ।

2. तुलसीदास : जीवन परिचय एवं कृतित्व।

3. सूरदास : जीवन परिचय एवं कृतित्व।

प्रश्नपत्र का स्वरूप एवं अंक विभाजन		अंक 40
प्रश्न 1	पुरे पाठ्यक्रम पर दस बहुविकल्पी प्रश्न।	10
प्रश्न 2	इकाई 1 पर लघुत्तरीय प्रश्न (3 में से 2)।	10
प्रश्न 3	इकाई 2 पर टिप्पणियाँ (3 मे 2) ।	10
प्रश्न 4	इकाई 3 और 4 पर दीर्घोत्तरी प्रश्न (अंतर्गत विकल्प के साथ)।	10

शिवाजी विश्वविद्यालय, कोल्हापुर

हिंदी अध्ययन मंडल

जून 2020 से लागू

हिंदी स्पेशल बी.ए.–3 (कला)

सत्र–V प्रश्नपत्र–X
प्रयोजनमूलक हिंदी
Discipline Specific Elective (D.S.E.-E9)

(शैक्षिक वर्ष –2020 –21, 2021–22, 2022–23)

प्रस्तुत पाठ्यक्रम का निर्माण विश्वविद्यालय अनुदान आयोग, नई दिल्ली की मॉडल पाठ्यचर्या (CBCS) के आलोक में किया गया है।

उद्देश्य :

1.हिंदी में कार्य करने की रूचि विकसित करना।

2.रोजगार उन्मुख शिक्षा एवं कौशल्य प्रदान करना।

3.पारिभाषिक शब्दावली से परिचित करना।

4.सरकारी पत्राचार के स्वरूप का परिचय कराना।

5.जनसंचार एवं इलेक्ट्रॉनिक माध्यमों से परिचय कराना।

6. अनुवाद स्वरूप, महत्व तथा उपयोगिता से परिचित कराना।

7. रोजगार परक हिंदी की उपयोगिता स्पष्ट कराना।

अध्यापन पद्धति

- स्वाध्याय .

- व्याख्यान, विवेचन तथा विश्लेषण

- संगोष्ठी तथा समूह चर्चा का आयोजन।

- अतिथियों एवं विद्वानों के व्याख्यान।

- दृक श्राव्य माध्यमों का प्रयोग।

- संगणक तथा इंटरनेट आदि साधनों का प्रयोग।

अध्ययनार्थ विषय –

इकाई – 1 पारिभाषिक शब्दावली।

दैनिक व्यवहार में प्रयुक्त अंग्रेजी शब्दों के हिंदी पर्यायवाची रूप । (परिशिष्ट में दिए हुए 'अ' तथा 'ब' विभाग के 50 शब्द)।

इकाई –2 सरकारी कार्यालयीन पत्राचार।

1. कार्यालय ज्ञापन।

2. परिपत्र।

3. कार्यालय आदेश।

4. सूचना।

5. अनुस्मारक पत्र।

इकाई –3 हिंदी भाषा और रोजगार के अवसर।

1. रेडियो में रोजगार।

2. विज्ञापन में रोजगार।

3. अनुवाद में रोजगार।

4. पत्रकारिता में रोजगार।

5. फिल्म में रोजगार।

इकाई –4 समाचार लेखन।

1. महाविद्यालयीन समारोह का समाचार लेखन।

2. सामाजिक समारोह का समाचार लेखन।

3. प्राकृतिक आपदाओं का समाचार लेखन।

4. दुर्घटनाओं का समाचार लेखन।

प्रश्नपत्र का स्वरूप एवं अंक विभाजन		अंक 40
प्रश्न 1	पारिभाषिक शब्दावली पर दस वस्तुनिष्ठ प्रश्न	10
प्रश्न 2	इकाई 2 पर लघुत्तरीय प्रशन (3 में से 2)।	10
प्रश्न 3	इकाई 3 पर टिप्पणियाँ (3 मे 2) ।	10
प्रश्न 4	इकाई 4 पर दीर्घोत्तरी प्रश्न (अंतर्गत विकल्प के साथ)।	10

परिशिष्ट (अ)

पारिभाषिक शब्दावली

	जनसंचार माध्यम संबंधी शब्द	
1.	Announcer	निवेदक
2.	Artistic	कलात्मक
3.	Audio-Visual	दृक–श्राव्य
4.	Banner	पताका
5.	Biographer	जीवनीकार
6.	Biweekly	अर्धसाप्ताहिक
7.	Bulletin	विज्ञाप्ति
8.	Catalogue	सूची
9.	Calligraphy	सुलेखन
10.	Caption	शीर्षक / चित्र परिचय
11.	Cartoonist	व्यंग्य चित्रकार
12.	Choreography	नृत्य रचना
13.	Columnist	स्तंभलेखक
14.	Commentator	समालोचक
15.	Compositer	अक्षर योजक
16.	Communication	संचार
17.	Creation	सृजन
18.	Correspondent	संवाददाता
19.	Information Technology	सूचना तंत्रज्ञान
20.	Interview	साक्षात्कार
21.	Interruption	रूकावट
22.	Journalist	पत्रकार
23.	Magazine	पत्रिका
24.	Source Language	स्रोत भाषा
25.	Transliteration	लिप्यंतरण

परिशिष्ट (ब)

शिक्षा सभा और संमेलन संबंधी शब्द

1.	Abstract	सार संक्षेप
2.	Academic Goal	शैक्षिक ध्येय
3.	Address	अभिभाषण संबोधन
4.	Adult Education	प्रौढ शिक्षा
5.	Agenda	कार्यसूची
6.	Anniversary	जयंती वर्षगाँठ
7.	Anthology	संकलन /संग्रह
8.	Appraisal	मूल्यांकन
9.	Attestation	साक्षांकन /अनुप्रमाणन
10.	Audiance	श्रोतागण
11.	Autonomous	स्वायत्त
12.	Bibliography	संदर्भ ग्रंथ सूची
13.	Bachelor	स्नातक
14.	Closing Speech	समापन भाषण
15.	Conference Hall	सम्मेलन भवन
16.	Conclusion	समापन
17.	Document	दस्तावेज
18.	Draft	प्रारूप मसौदा
19.	Guardian	अभिभावक
20.	Humanity	मानविकी
21.	Hypothesis	परिकल्पना
22.	Inauguration	उद्घाटन
23.	Informal	अनौपचारिक
24.	Symposium	संगोष्ठी
25.	Viva-Voce	मौखिक परीक्षा

शिवाजी विश्वविद्यालय, कोल्हापुर

हिंदी अध्ययन मंडल

जून 2020 से लागू

हिंदी स्पेशल बी.ए.–3 (कला)

सत्र–V प्रश्नपत्र–XI
भाषा विज्ञान और हिंदी भाषा

Discipline Specific Elective (D.S.E.-E10)

(शैक्षिक वर्ष –2020 –21, 2021–22, 2022–23)

प्रस्तुत पाठ्यक्रम का निर्माण विश्वविद्यालय अनुदान आयोग, नई दिल्ली की मॉडल पाठ्यचर्या (CBCS) के आलोक में किया गया है।

उद्देश्य :

1) भाषा के विविध रूपों का परिचय कराना ।

2) भाषा विज्ञान का सामान्य परिचय कराना।

3) हिंदी भाषा एवं लिपि के उद्भव और विकास का परिचय कराना ।

4) भाषा की शुद्धता के प्रति छात्रों को जागृत करना ।

5) मानक हिंदी वर्तनी और व्याकरण से छात्रों को परिचित कराना ।

अध्यापन पद्धति

- स्वाध्याय .

- व्याख्यान, विवेचन तथा विश्लेषण

- संगोष्ठी तथा समूह चर्चा का आयोजन।

- अतिथियों एवं विद्वानों के व्याख्यान।

- दृक श्राव्य माध्यमों का प्रयोग।

- संगणक तथा इंटरनेट आदि साधनों का प्रयोग।

अध्ययनार्थ विषय –

इकाई 1– भाषा की परिभाषाएँ, भाषा की विशेषताएँ, भाषा की उत्पति एवं ततसंबंधी विविध वाद–दैवी उत्पत्ति सिद्धांत, धातु सिद्धांत, अनुकरण सिद्धांत, श्रमपरिहार सिद्धांत, मनोभावाभिव्यंजक सिद्धांत, समन्वित सिद्धांत ।

इकाई 2– भाषा परिवर्तनशीलता के कारण ।

 भाषा के विविध रूप– बोली और परिनिष्ठित भाषा ।

 बोलियों के बनने के कारण, बोली और भाषा में अंतर ।

इकाई 3– हिंदी भाषा का उद्भव और विकास ।

 हिंदी का शब्दसमूह, हिंदी भाषा के विविध रूप–राष्ट्रभाषा, राजभाषा, संपर्क भाषा ।

इकाई 4 – हिंदी की विविध बोलियाँ–अवधी, ब्रज, खडीबोली, भोजपुरी।

 लिपि विकास का सामान्य परिचय, देवनागरी लिपि की वैज्ञानिकता ।

प्रश्नपत्र का स्वरूप एवं अंक विभाजन		अंक 40
प्रश्न 1	पुरे पाठ्यक्रम पर दस बहुविकल्पी प्रश्न।	10
प्रश्न 2	इकाई 3पर लघुत्तरीय प्रशन (3 में से 2)।	10
प्रश्न 3	इकाई 4 पर टिप्पणियाँ (3 मे 2) ।	10
प्रश्न 4	इकाई 1 और 2 पर दीर्घोत्तरी प्रश्न (अंतर्गत विकल्प के साथ)।	10

SHIVAJI UNIVERSITY, KOLHAPUR.

Accredited By NAAC with 'A' Grade

Revised Syllabus For

B.A. Part-III

English

Syllabus to be implemented from

June, 2020 onwards.

Shivaji University, Kolhapur
B. A.III
Compulsory English
Ability Enhancement Compulsory Course (CBCS)
ENGLISH FOR COMMUNICATION
From June 2020 Onwards

Course Objectives:
➢ To enhance students' communication skills
➢ To impart employability skills to students
➢ To prepare students for competitive examinations
➢ To enable students to acquire professional skills such as media writing
➢ To enable students to learn manners and etiquettes required at workplace
➢ To enhance students' reading comprehension skills
➢ To create interest in English literature among students
➢ To inculcate human values and ethics in order to enable students' to become good citizens of the country

Course Outcomes: After the completion of the course, the students will be able to:
➢ Communicate in English, in oral and written modes, in their day-to-day lives as well as at workplaces.
➢ Face job interviews confidently and efficiently.
➢ Acquire soft skills required at workplaces and in real life.
➢ Learn group behavior and team work.
➢ Learn to value and respect others' opinions and views and develop democratic attitude.
➢ Face competitive examinations confidently and efficiently with adequate linguistic confidence.
➢ Acquire professional skills required in media writing such as writing editorials.
➢ Learn to appreciate and enjoy reading poetry and prose passages.
➢ Acquire human values and develop cultured outlook.

SEMESTER V   AECC 5

MODULE I
A. Interview Skills
B. The Interview -V.V. John
MODULE II
A. Grammar for Competitive Examinations
B. The Lottery - Shirley Jackson
MODULE III
A. Writing Skills for Competitive Examinations
B. After Twenty Years - O' Henry
MODULE IV
A. I Shall Return To This Bengal - Jibananda Das
B.(i) Song of Youth - A. P. J. Abdul Kalam
   (ii) The Orphan Girl - Henry Derezio

*Note: Semester V: 10 Marks for Internal Evaluation: STUDENTS' SEMINAR

SEMESTER VI **AECC 6**

MODULE V
    A. Group Discussion
    B. The Lighthouse Keeper of Aspinwall - Henry Sienkiewicz
MODULE VI
    A. Note Making and Note Taking
    B. Three Questions - Leo Tolstoy
MODULE VII
    A. Media Writing
    B. Eight Rupees - Murli Das Melwani
MODULE VII
    A. The Mystic Drum - Gabriel Okara
    B. (i) Two Dead Soldiers- Jean Arasanayagam
      (ii) Bora Ring - Judith Wright

*Note: Semester VI: 10 Marks for Internal Evaluation: STUDENTS' GROUP PROJECT

Division of Teaching Hours 8 Modules x 15 Hours = 120 Hours

SHIVAJI UNIVERSITY, KOLHAPUR.

Accredited By NAAC with 'A' Grade

Revised Syllabus For

B.A. Part-III

English

Syllabus to be implemented from

June, 2020 onwards.

B. A.III
Compulsory English
Ability Enhancement Compulsory Course (CBCS)
ENGLISH FOR COMMUNICATION
From June 2020 Onwards

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SEMESTER V   AECC 5

MODULE I
   A. Interview Skills
   B. The Interview -V.V. John
MODULE II
   A. Grammar for Competitive Examinations
   B. The Lottery - Shirley Jackson
MODULE III
   A. Writing Skills for Competitive Examinations
   B. After Twenty Years - O' Henry
MODULE IV
   A. I Shall Return To This Bengal - Jibananda Das
   B.(i) Song of Youth - A. P. J. Abdul Kalam
      (ii) The Orphan Girl - Henry Derezio

*Note: Semester V: 10 Marks for Internal Evaluation: STUDENTS' SEMINAR

SEMESTER VI   AECC 6

MODULE V
    A. Group Discussion
    B. The Lighthouse Keeper of Aspinwall - Henry Sienkiewicz
MODULE VI
    A. Note Making and Note Taking
    B. Three Questions - Leo Tolstoy
MODULE VII
    A. Media Writing
    B. Eight Rupees - Murli Das Melwani
MODULE VII
    A. The Mystic Drum - Gabriel Okara
    B. (i) Two Dead Soldiers- Jean Arasanayagam
      (ii) Bora Ring - Judith Wright

*Note: Semester VI: 10 Marks for Internal Evaluation: STUDENTS' GROUP PROJECT

Division of Teaching Hours 8 Modules x 15 Hours = 120 Hours

Shivaji University, Kolhapur
B. A.III
Compulsory English
Ability Enhancement Compulsory Course (CBCS)
ENGLISH FOR COMMUNICATION

PATTERN OF QUESTION PAPER (June 2020 Onwards)

Semester V (Paper E)   **Total Marks: 40**

Q. No	Sub Q.	Type of Question	Based on	Marks
Q. 1	A.	Four multiple choice questions with four alternatives to be set	Prose and Poetry	03
	B.	Answer in one word/phrase/sentence each.	Prose and Poetry	03
	C.	Two different **Vocabulary Exercises** to be set for 1 mark each	Prose and Poetry	02
Q.2	A.	Answer the following questions in 3-4 sentences each. (2 out of 3)	2 on Prose and 1 on Poetry	04
	B.	Write **Short Note** on the following in about 7-8 sentences each. (1 out of 2)	1 on Prose and 1 on Poetry	04
Q.3	--	Questions to be set on **Interview Skills (A or B)**	Module I A	08
Q.4	--	Question to be set on **Grammar for Competitive Examinations (A or B)**	Module II A	08
Q.5	--	Question to set on **Writing Skills for Competitive Examinations(A or B)**	Module III A	08

Semester VI (Paper F)   **Total Marks: 40**

Q. No	Sub Q.	Type of Question	Based on	Marks
Q. 1	A.	Four multiple choice questions with four alternatives to be set	Prose and Poetry	03
	B.	Answer in one word/phrase/sentence each.	Prose and Poetry	03
	C.	Two different **Vocabulary Exercises** to be set for 1 mark each.	Prose and Poetry	02
Q.2	A.	Answer the following questions in 3-4 sentences each. (2 out of 3)	2 on Prose and 1 on Poetry	04
	B.	Write **Short Note** on the following in about 7-8 sentences each. (1 out of 2)	1 on Prose and 1 on Poetry	04
Q.3	--	Question to be set on **Group Discussion(A or B)**	Module V A	08
Q.4	--	Question to be set on **Note Making and Note Taking(A or B)**	Module VI A	08
Q.5	--	Question to set on **Media Writing(A or B)**	Module VII A	08

Shivaji University, Kolhapur
B. A. Part III
Special English
INTRODUCTION TO LITERARY CRITICISM (CBCS)
Discipline Specific Elective
Semester V (Paper VII) (DSE- E11) & Semester VI (Paper XII) (DSE- E136)
From June 2020 onwards

Course Objectives:
  ➢ To introduce students to the major trends in literary criticism.
  ➢ To familiarize students with the major critical concepts.
  ➢ To help students to study the original contributions made in the field of literary criticism.
  ➢ To acquaint students with the various literary and critical movements.
  ➢ To train students to write critical appreciation of poetry.

Course Outcomes:
  ➢ Students are able to understand the major trends in criticism.
  ➢ Students are able to interpret critical concepts.
  ➢ Students are able to study the original contributions to literary criticism.
  ➢ Students are acquainted with literary and critical movements.
  ➢ Students are able to understand the meaning and appreciate the poems critically.

Semester V(Paper VII) (DSE- E11)	

Module I	**Introduction to Literary Criticism:**
	  1. Nature of Criticism
	  2. Function of Criticism

Module II	**Classical Criticism:**
	  1. The Concept of Tragedy
	  2. The Ideal Tragic Hero
	  (From **Aristotle's** *Poetics*)

Module III	**Neo-classical Criticism:** Dr. Samuel Johnson's *Preface to Shakespeare* (1765)

Module IV	**Literary Terms:**
	  1. Symbolism 2. Realism
	  3. Humour 4. Paradox

Note: Semester V: 10 Marks for Internal Evaluation: STUDENTS' SEMINAR	
Semester VI (Paper XII) (DSE- E136)	
Module V	**Romantic Criticism:** William Wordsworth's Theory of Poetic Diction (From **William Wordsworth's** *Preface to Lyrical Ballads*)
Module VI	**Victorian Criticism:** Matthew Arnold's Touchstone Method (From **Matthew Arnold's** *The Study of Poetry*)
Module VII	**Modern Criticism:**

	T S Eliot's *Tradition and Individual Talent* (1919)
Module VIII	**Practical Criticism:**
	Poetry

<div style="background:yellow">**Note: Semester VI: 10 Marks for Internal Evaluation: STUDENTS' GROUP PROJECT**</div>

Division of Teaching Hours 8 Modules x 15 Hours = 120 Hours

Recommended Reading: Semester V and Semester VI

Abrams, M. H. *A Glossary of Literary Terms* (8th Edition). New Delhi: Akash Press, 2007.

Alexander, L. G. *Prose and Poetry Appreciation for Overseas Students*. London: Longman Green and Comp. Ltd., 1966.

Allex,Latter & Rachel, Teubner. *William Wordsworth's Preface to the Lyrical Ballads*. London: Macat Library, 2018.

Bliss, Perry. *A Study of Poetry*. Kindle Edition, 22 Feb., 2018.

Butcher, S. C. *Poetics*. New Delhi: Kalyani Publishers, 1978.

Bywater, Ingram. *Aristotle's Poetics*. Oxford: Atthe Clarendon Press, 1976.

Cuddon, J. A. *The Penguin Dictionary of Literary Terms and Literary Theory* (4th Edition). London and New York: Penguin, 2000.

Davis, Joseph, K. Pathea, R Broughton and Michael Wood. *Literature*. Illinois: Scott, Foresman and Comp. Glenviews, 1977.

Eliot, T.S. *The Sacred Wood – Essays on Poetry and Criticism*. (Seventh edition),1950.

Enright, D.J. & Ernst De Chickera. *English Critical Texts: 16th Century to 20th Century*.OUP, 1968.

Fyfe, Hamilton. *Aristotle's Art of Poetry*. London: OUP, 1940.

Gray, Martin. *A Dictionary of Literary Terms* (York Handbooks), Pearson Education, 2009.

Hudson, W. H. *An Introduction to the Study of Literature*. New Delhi: Atlantic, 2007.

Richards, I. A. *Practical Criticism: A Study of Literary Judgment.* New Delhi: UBS Publishers, 2002.

Scott James, R. A. *The Making of Literature*. Mumbai: Allied Publishers Pvt. Ltd., 1963.

Sherbo, Arthur(ed.). *The Yale edition of the works of Samuel Johnson*.Vol.7. New haven: Yale University Press,1968.

S. Ramaswami & V. S. Seturaman (ed.) *The English Critical Tradition: An Anthology of English Literary Criticism*, Volume 1,. New Delhi: Macmillan Publishers India Ltd. 1977/2009.

Seturaman, V. S., C. T. Indra and T. Siraman. *Practical Criticism*. Madras: Macmillan India Ltd., 1995.

Waugh, Patricia (ed.) *Literary Theory and Criticism: An Oxford Guide*. New York: Oxford University Press, 2006.

Wimsatt, W. K. and Cleanth Brooks. *Literary Criticism: A Short History*. New Delhi: Oxford and IBH Publishing Company Pvt. Ltd., 1957.

Wellek, Rene and Austin Warren. *Theory of Literature.* London: Jonathan Cape, 1949.

Shivaji University, Kolhapur
B. A. Part III
Special English
INTRODUCTION TO LITERARY CRITICISM (CBCS)
Discipline Specific Elective
Semester V (Paper VII) (DSE- E11)
PATTERN OF QUESTION PAPER
From June 2020 onwards

Total Marks: 40

Q1. Objective type Question
    A) Multiple choice questions with four alternatives.   4
    B) Answer the following questions in one word/phrase/sentence each.   4
    (Q1 A and B to be set on topics covering **Module I to IV**)
        (At least one item to be set on each Module)
Q2. Answer the questions in about 250-300 words each.
    (A or B to be set on **Module I, II, and III**)   10
Q3. Answer the questions in about 250-300 words each.
    (A or B to be set on **Module I, II, and III**)   10
Q3 A. Write short notes on the following: (Any 3 out of 5)   12
(3 to be set on **Module IV** and 2 on **Module I, II, III** not covered in question 2 and 3)

INTRODUCTION TO LITERARY CRITICISM (CBCS)
Semester VI (Paper XII) (DSE- E136)
PATTERN OF QUESTION PAPER
From June 2020 onwards

Total Marks: 40

Q1. Objective type Question
    A) Multiple choice questions with four alternatives.   4
    B) Answer the following questions in one word/phrase/sentence each.   4
    (Q1. A and B to be set on topics covering **Module V to VII**)
        (At least one item to be set on each Module)
. Q2. Answer in the questions 250-300 words each.   10
    (A or B to be set on **Module V, VI, and VII**)
Q3. Answer the questions in about 250-300 words each.   10
    (A or B to be set on **Module V, VI, and VII**)
Q4. Write critical appreciation of the given poem.   12
(with the help of points such as title, theme, content, devices, message, style, rhyme-scheme, diction, type of poem, tone, stanza-pattern, metre, etc. (**Based on Module VIII**)

EQUIVALENCE

Old Title	New Title
LITERARY CRITICISM AND LITERARY APPRECIATION	**INTRODUCTION TO LITERARY CRITICISM**

Shivaji University, Kolhapur
B. A.III
English Special
ENGLISH POETRY (CBCS)
Discipline Specific Elective
Semester V (Paper VIII) (DSE – E12) and Semester VI (Paper XIII) (DSE – E137)
(From June 2020 Onwards)

Course Objectives:
- ➤ To make students engaged and curious readers of poetry
- ➤ To introduce students to poetry from various cultures and traditions
- ➤ To make students understand that poetry gives intellectual, moral and linguistic pleasures
- ➤ To make students hear and read poems aloud and to memorize lines

Course Outcomes:
- ➤ Students will be able to trace the development of the poetry in English from the days of Shakespeare to the contemporary India.
- ➤ Students will be able to appreciate and analyze the poems properly.
- ➤ Students will have a fairly comprehensive view of the Western and Eastern poetic tradition and they will be able to relate it to various literary movements.
- ➤ Students will have an insight into poetry and they will be able to make a lively and interesting reading.

SEMESTER V (Paper VIII) (DSE – E12)		
MODULE NO.	**TITLE OF THE MODULE**	**NAME OF THE POET**
I.	**Topics For Background Readings:**	
	1. Elizabethan Poetry	
	2. Metaphysical Poetry	
	3. Romantic Poetry	
II. Selections from Elizabethan Poetry:		
	1. Sweet Warrior (Sonnet 57)	Edmund Spenser
	2. Sonnet To The Moon	Sir Philip Sydney
	3. Full Many A Glorious Morning… (Sonnet 33)	William Shakespeare
III. Selections from Metaphysical Poetry:		
	1. The Sun Rising	John Donne
	2. The Retreat	Henry Vaugham
	3. The Collar	George Herbert
IV. Selections from Romantic Poetry:		
	1. My Heart Leaps Up	William Wordsworth
	2. The Rime of the Ancient Mariner	S. T. Coleridge
	3. Ozymandias	P. B. Shelley
	4. When We Two Parted	Lord Byron
*Note: Semester V: 10 Marks for Internal Evaluation: STUDENTS' SEMINAR		

SEMESTER VI (Paper XIII) (DSE – E137)		
MODULE NO.	TITLE OF THE MODULE	NAME OF THE POET
V. Topics For Background Readings:		
1.	Victorian Poetry	
2.	Modern English Poetry	
3.	Modern Indian English Poetry	
VI. Selections from Victorian Poetry:		
1.	The Lady Of Shallot	Alfred Lord Tennyson
2.	My Last Duchess	Robert Browning
3.	Love Came Down At Christmas	Christiana Rossetti
VII. Selections from Modern English Poetry:		
1.	No Second Troy	W. B. Yeats
2.	The Hollow Men	T. S. Eliot
3.	Tonight I Can Write	Pablo Neruda
VIII. Selections from Modern Indian English Poetry:		
1.	The Professor	Nissim Ezekiel
2.	A Hot Noon in Malabar	Kamala Das
3.	A River	A. K. Ramanujan
4.	A Kind of Happiness	Jayanta Mahapatra
*Note: Semester VI: 10 Marks for internal Evaluation: STUDENTS' GROUP PROJECT		

Division of Teaching Hours: 8 Modules x 15 Hours each= 120 Hours

Recommended Reading: Semester V and Semester VI
Appelbaum, Stanley. *English Romantic Poetry: An anthology*. Dover Publications Inc. 1996.
Burrow, Colin. *Metaphysical Poetry.* Penguin Classics. 2006.
Chaudhuri, Roshinka. *A History of Indian Poetry in English.* Cambridge University press. 2016.
Chaudhuri, Sukanta. *Modern Indian Literature*, New Delhi: OUP, 2004.
Courthope, W.J. *A History of English Poetry*. Vol.I Macmillan, 1995.
Craig, W.J. (ed.). *The Complete works of William Shakespeare*. Oxford: OUP., 1905.
Fenton, James. *An Introduction to English Poetry*. New York: Farrar, Strauss and Giroux, 2004.
Gardner, Martin, *The Annotated Ancient Mariner,* New York:Clarkson Potter,1965.
Harold Bloom and Lionel Trilling. (ed.) *Romantic Prose and Poetry,* New York: OUP, 1973.
Mitra, Zinia(ed.). Indian *Poetry in English:Critical Essays*. New Delhi: PHI Learning Pvt
       Ltd.,2012.
Naik, M.K. *A History of Indian English Literature*. Delhi, 1982.
Narasimhaiah, C.D., (ed.) *An Anthology of Commonwealth Poetry,*Delhi: Macmillan, 1990.
Negri,Paul. *English Victorian poetry.* Dover Publications Inc. 1998
Ramanan, M.G. *Modern English Poetry: A Selection*. New Delhi:Orient Blackswan,2013.
Samuel Taylor Coleridge, *Biographia Literaria,* ed. George Watson. London: Everyman, 1993.

Shivaji University, Kolhapur
B. A.III
English Special
ENGLISH POETRY (CBCS)
Discipline Specific Elective
Semester V (Paper VIII) (DSE – E12)

PATTERN OF QUESTION PAPER   **From June 2020 Onwards**

Marks: 40

Q1. A) Four multiple choice questions with four alternatives (4)

    B) Answer the following questions in one word/ phrase/sentence each. (4)

        (Q. 1 A and B to be set on **Module II, III and IV**)

Q.2. Answer the following questions in about 250-300 words. (10)

        (A or B to be set on **Module I**)

Q.3. Answer the following questions in about 250-300 words. (10)

      (A or B to be set on **Module II, III or IV**)

Q.4. Write Short Notes in about 100-150 words each (3out of 4) (12)

      (Two be set on **Module I** and two be on **Module II, III or IV**)

ENGLISH POETRY (CBCS)
Discipline Specific Elective
Semester VI (Paper XIII) (DSE – E137)

Marks: 40

Q1. A) Four multiple choice questions with four alternatives (4)

    B) Answer the following questions in one word/ phrase/sentence each. (4)

      (Q. 1 A and B to be set on **Module VI, VII and VIII**)

Q.2. Answer the following questions in about 250-300 words. (10)

      (A or B to be set on **Module V**)

Q.3. Answer the following questions in about 250-300 words. (10)

      (A or B to be set on **VI, VII or VIII**)

Q.4. Write Short Notes in about 100-150 words each (3out of 4) (12)

      (Two be set on **Module V** and two be on **Module VI, VII or VIII**)

EQUIVALENCE

Old Title	New Title
Understanding Poetry	**English Poetry**

Shivaji University, Kolhapur
B. A. Part III
Special English
ENGLISH DRAMA (CBCS)
Discipline Specific Elective
Semester V (Paper IX) ((DSE – E13) & Semester VI (Paper XIV) (DSE – E138)
From June 2020 onwards
Course Objectives:
  - ➢ To make students understand different forms of drama
  - ➢ To enable students to relate drama to their ideological or socio-political contexts
  - ➢ To help students improve their creative and imaginative faculties through the reading of drama
  - ➢ To enable students to know about various aspects of the drama
Course Outcomes:
  - ➢ Students are able to understand different forms of drama.
  - ➢ Students are able to relate drama to their ideological or socio-political contexts.
  - ➢ Students are able to improve their creative and imaginative faculties through the reading of drama.
  - ➢ Students are able to know about various aspects of the drama.

Semester V (Paper IX) ((DSE – E13)
MODULE I
  Definition and Elements of Drama
MODULE II
  Tragedy as a Form
MODULE III
  The Importance of Being Earnest - Oscar Wilde
MODULE IV
  Hamlet – William Shakespeare

  Division of Teaching Hours: 4 Modules X 15 Periods = 60 Periods
Prescribed Texts:
Wilde, Oscar. *The Importance of Being Earnest.* New Delhi: General Press, 2018.
Shakespeare, William. *Hamlet.* Penguin Books, 1980.

Note: Semester V: 10 Marks for Internal Evaluation: STUDENTS' SEMINAR

Semester VI (Paper XIV) (DSE – E138)
MODULE V
  Types of Drama
MODULE VI
  Comedy as a Form
MODULE VII
  Nagmandala – Girish Karnad
MODULE VIII
  Harvest – Manjula Padmanabhan

Division of Teaching Hours: 4 Modules X 15 Periods = 60 Periods
Prescribed Texts:
Karnad, Girish. *Nagmandala.* Oxford University Press, 1990.
Padmanabhan, Manjula. *Harvest.* Delhi: Penguin, 1997.

***Note: Semester VI: 10 Marks for Internal Evaluation: STUDENTS' GROUP PROJECT**

Recommended Reading: Semester V and Semester VI
Aasand, Hardin L. *Stage Directions in Hamlet: New Essays and New Directions*. NJ: Fairleigh
    Dickinson University Press, 2003.
Babu, Munchi Sarat. *Indian Drama.* New delhi: Prestige Books, 1997.
Bhatt, S.K. *Indian English Drama: A Critical Study.* New Delhi: Sterling Publishers Pvt. Ltd.,
    1987.
Bloom, Harold. *The Importance of Being Earnest: Modern Critical Interpretations.* Chelsea
    House Pub., 1988.
Driver, T.F. *Drama and History*. New York: Columbia University Press, 1967.
Ddiya, Jaydipsinh. (ed.) *The Plays of Girish Karnad: Critical Perspectives*. New Delhi: Prestige
    Books, 1999.
Gargy, Balwant. *Folk Theatre of India*. Culcutta: Rupa & Co., 1991.
Gillespie, Michael Patrick. *The Importance of Being Earnest.*(Norton Critical Editions).
    W.W.Norton and Co., 2006.
Hibbard, G.R. (ed.) *Hamlet*. OUP: 1988.
Hirsh, James. Shakespeare and the History of Soliloquies. NJ: Farleigh Dickinson University
    Press, 2003.
Joshi, R.G. *Myth in Indian Drama.* Delhi: B.R. Publishing Corporation, 1984.
Kumar, Nand. *Indian English Drama: A Study in Myths*. New Delhi: Sarup and sons, 2003.
MacCary, Thomas. *Hamlet: A Guide to the Play*. London: Greenwood Press, 1988.
Martin, James. *The Meaning of the 21st Century*. New York: Riverhead Penguin, 2007.
Priestley, J.B. *The Art of the Dramatist*. London: Heinemann, 1957.
Rajkumar, K. *Socio-Political Realities in Harvest*. Purna:RHI,Mahmul, 2012.
Robertson, Ronald. *Globalization: Social Theory and Global Culture*. London: Sage, 1992.
Sen,B. *The Importance of Being Earnest.* Unique Publishers,2015.
Styan, J.L. *The Elements of Drama*. Cambridge: Cambridge University Press, 1967.
Vaidyanathan, G. *The Importance of Being Earnest.* New Delhi: Narain Publications, 2018.
Worthen, W.B. (ed.). *Anthology of Drama* (Fourth edition). London: Cengage Learning
    EMEA, 2004.

B. A. Part III
Special English
ENGLISH DRAMA (CBCS)
Discipline Specific Elective
Semester V (Paper IX) ((DSE – E13)
PATTERN OF QUESTION PAPER   (From June 2020 onwards)

Marks: 40

Q1. A) Four multiple choice questions with four alternatives   (4)

  B) Answer the following questions in one word/ phrase/sentence each.   (4)

   (Q. 1 A and B to be set on **Module III and IV**)

Q.2. Answer the following questions in about 250-300 words.   (10)

   (A or B to be set on **Module I and II**)

Q.3. Answer the following questions in about 250-300 words.   (10)

   (A or B to be set on **Module III and IV**)

Q.4. Write Short Notes in about 100-150 words each (3out of 4)   (12)

   (Two be set on **Module I and II** and two be on **Module III and IV**)

ENGLISH DRAMA (CBCS)
Discipline Specific Elective
Semester VI (Paper XIV) (DSE – E138)
PATTERN OF QUESTION PAPER   (From June 2020 onwards)

Marks: 40

Q1. A) Four multiple choice questions with four alternatives   (4)

  B) Answer the following questions in one word/ phrase/sentence each.   (4)

   (Q. 1 A and B to be set on **Module VII and VIII**)

Q.2. Answer the following questions in about 250-300 words.   (10)

   (A or B to be set on **Module V and VI**)

Q.3. Answer the following questions in about 250-300 words.   (10)

   (A or B to be set on **VII and VIII**)

Q.4. Write Short Notes in about 100-150 words each (3out of 4)   (12)

   (Two be set on **Module V and VI** and two be on **Module VII and VIII**)

EQUIVALENCE

Old Title	New Title
Understanding Drama	**English Drama**

Shivaji University, Kolhapur
B. A. Part III Special English
ENGLISH NOVEL (CBCS)
Discipline Specific Elective
Semester V (Paper X) ((DSE – E14) & Semester VI (Paper XV) (DSE – E139)
From June 2020 onwards

Course Objectives:
- ➢ To make students understand different forms of novel.
- ➢ To enable students to relate novels to their ideological or socio-political contexts.
- ➢ To help students to improve their creative and imaginative faculties through the reading of novels.
- ➢ To enable students to know about various aspects of the novel.

Course Outcomes:
- ➢ Students are able to understand different forms of novel.
- ➢ Students are able to relate novels to their ideological or socio-political contexts.
- ➢ Students are able to improve their creative and imaginative faculties through the reading of novels.
- ➢ Students are able to know about various aspects of the novel.

SEMESTER V (Paper X) (DSE – E14)

MODULE I
Rise and Development of the Novel
MODULE II
Aspects of the Novel
MODULE III
The Old Man and the Sea – Ernest Hemingway
MODULE IV
The Power and the Glory – Graham Greene

Division of Teaching Hours: 4 Modules X 15 Periods = 60 Periods

Prescribed Texts:
Hemingway, Ernest. *The Old Man and the Sea.* New York: Simon & Schuster, 1952.
Greene, Graham. *The Power and the Glory.* New York: Time Reading Special Edition. 1940, 1962.

*Note: Semester V: 10 Marks for Internal Evaluation: STUDENTS' SEMINAR

SEMESTER VI (Paper XV) (DSE – E139)

MODULE V
Historical and Psychological Novel
MODULE VI
Satirical Novel and Epistolary novel
MODULE VII
Animal Farm: A Fairy Tale - George Orwell
MODULE VIII
The Guide - R. K. Narayan

Division of Teaching Hours: 4 Modules X 15 Periods = 60 Periods

Prescribed Texts:
Orwell, George. *Animal Farm: A Fairy Tale*. New York: Signet Classic, 1996.
Narayan, R. K. *The Guide*. US: Viking Press, 1958.

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*Note: Semester VI: 10 Marks for internal Evaluation: STUDENTS' GROUP PROJECT

Suggested Reading: for Semester V and Semester VI

Auden,W.H. *The Enchafed Flood: The Romantic Econography of the Sea*. New York: Random, 1950.
Abrams, M. H. *A Glossary of Literary Terms* (8th Edition) New Delhi, Akash Press – 2007
Bender, Bert. *Sea Brothers: The Tradition of American Sea Fiction from Moby-Dick to the Present.* Philadelphia: University of Pennsylvania Press, 1988.
Bloom, Harold. *Ernest Hemingway's The Old Man and the Sea: Modern Critical Interpretations.*Cheasea House Publications, 2008.
Bradbury, Malcolm. *The Novel Today*. Glasgow: F. C. Paperbacks, 1982.
Brooks and Warren. *Understanding Fiction*. Prentice Hall, 1959.
Dedria, Bryfonski & Hall, Sharon. *Twentieth Century Literary Criticism: George Orwell*. Michigan: Book Tower, 1979.
Edel, Leon. *The Psychological Novel: 1900-1950*. Ludhiana: Kalyani, 1997.
Forster, E. M. *Aspects of Novel*. London. 1949.
Hynes, Samuel, ed. *Graham Greene: A Collection of Critical Essays*. New Jersy: Prentice Hall.Inc. 1973.
Jones, David P. *Graham Greene*. Edinburgh: Oliver and Boyd. 1963.
Kerala, Calling. *From Eric Blair to George Orwell, Biography*. London: Sage, 2003.
Kermode, Frank. *Sense of an Ending*. OUP, 1967.
Lall, Pamji. *Graham Greene: The Power and the Glory: A Critical Study*. New Delhi: Roma Brothers India Pvt. Ltd. 2005.
Lewis,R.w.B. & Conn, Petr J.ed. *Graham Greene: The Power and the Glory: Text and Criticism*. New York: The Viking Press, 1970.
Lubbock, Percy. *The Craft of Fiction*. London: Jonahan Cape, 1965.
Matz, Jesse. *The Modern Novel*: A Short Introduction. Oxford Blackwell, 2004.
Meyers, Jeffery. *George Orwell: The Critical Heritage*. Routledge, 1997.
Rimmon-Kennan, Shlomith. *Narrative Fiction*. London and New York: Routledge, 2005.
Roy, Ruby. *A Critical Study of R.K. Narayan's Swami and Friends and The Guide*. Delhi: Kalpaz Publications, 2015.
Rees, R. J. *Introduction to English Literature*. London: Macmillan, 1966/1968.
Singh, P.K. *The Novels of R. K. Narayan :A Critical Study*. New Delhi: Atlantic Publishers.
Stade, George, ed. *Six Contemporary British Novelists*. New York: Colombia University Press, 1976.
Subramaniam, K.S. *Graham Greene: A Study of Graham Greene's Works*. Bareilly: Prakash Book Depot, 1978.
Vinson, James, ed. *Contemporary Novelists*. London: St. James Press, 1972.
Watt, Ian.. *Rise of the Novel*. London: Penguin, 1957.
Woodcock, George. *20th Century Fiction*. London: The Macmillan Press Ltd., 1983.

Shivaji University, Kolhapur
B. A. Part III
Special English
ENGLISH NOVEL (CBCS)
From June 2020 onwards
PATTERN OF QUESTION PAPER FOR
(Semester V Paper X DSE – E14)

Marks: 40

Q1. A) Four multiple choice questions with four alternatives (4)

B) Answer the following questions in one word/ phrase/sentence each. (4)

(Q. 1 A and B to be set on **Module III and IV**)

Q.2. Answer the following questions in about 250-300 words. (10)

(A or B to be set on **Module I and II**)

Q.3. Answer the following questions in about 250-300 words. (10)

(A or B to be set on **Module III and IV**)

Q.4. Write Short Notes in about 100-150 words each (3out of 4) (12)

(Two be set on **Module I and II** and two be on **Module III and IV**)

PATTERN OF QUESTION PAPER FOR
(Semester VI Paper XV DSE – E139)

Marks: 40

Q1. A) Four multiple choice questions with four alternatives (4)

B) Answer the following questions in one word/ phrase/sentence each. (4)

(Q. 1 A and B to be set on **Module VII and VIII**)

Q.2. Answer the following questions in about 250-300 words. (10)

(A or B to be set on **Module V and VI**)

Q.3. Answer the following questions in about 250-300 words. (10)

(A or B to be set on **VII and VIII**)

Q.4. Write Short Notes in about 100-150 words each (3out of 4) (12)

(Two be set on **Module V and VI** and two be on **Module VII and VIII**)

EQUIVALENCE

Old Title	New Title
Understanding Novel	**English Novel**

Shivaji University, Kolhapur
B.A. III
English Special
LANGUAGE AND LINGUISTICS (CBCS)
Discipline Specific Elective
Semester V –Paper XI (DSE - E15) & Semester VI – Paper XVI (DSE - E140)
From June 2020 onwards

LANGUAGE AND LINGUISTICS
Semester V –Paper XI (DSE -E 15)

Course Objectives:
➢ To orient students to the concept of communication.
➢ To make the students familiar with varieties of the English language.
➢ To acquaint students with different levels of the study of language.
➢ To study the basic units of grammar.

Course Outcomes:
➢ Students know the concept of communication.
➢ Students are familiar with varieties of the English language.
➢ Students know different levels of study of the English language.
➢ Students know basic units of grammar.

Semester V –Paper XI   DSE - E 15

MODULE I
Language and Communication
 i. Definitions and characteristics of language
ii. Human and Animal communication systems (Special reference to
             Hockett's 7 characteristics of language)
MODULE II
Phonology
MODULE III
Morphology
MODULE IV
Words

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*Note: Semester V: 10 Marks for Internal Evaluation: STUDENTS' SEMINAR

Division of Teaching Hours: 4 Modules X 15 Periods = 60 Periods

Reference Books :

Balasubramaniam, T. *A Textbook of English Phonetics for Indian Students*, Delhi: McMillan, 1981.

Bansal, R.K. & Harrison, J.B., *Spoken English,* Hyderabad: Orient Longman, 2000.

Hockett, C.F., *A Course in Modern Linguistics*, MacMillan, . 1963.

Hudson, Richard, *Sociolinguistics,*Cambridge: Cambridge University Press, 1996.

Jones, Daniel, *English Pronouncing Dictionary,* ELBS Edition.

Leech et al, *English Grammar Today: a New Introduction*, Hyderabad: McMillan, 2010.

Lyons, John, *Language and Linguistics: An Introduction,* Cambridge: Cambridge University Press, 1981.

Quirk, R., Greenbaum, S., Leech, G. &Svartvik, J., *A Comprehensive Grammar of English*, New Delhi: Pearson, 2010.

Quirk, Randolph &Greenbaum, Sidney, *A University Grammar of English*, New Delhi: Pearson, 2015.

Radford, A., Atkinson, M., Britain, D., Clahsen, H. & Spencer, A., *Linguistics: An Introduction*, Cambridge: Cambridge University Press, 1999.

Trask, R. L, *Key Concepts in Language and Linguistics*, London: Routledge, 1999.

Verma, S.K. &Krishnaswamy, N., *Modern Linguistics,* Hyderabad: Oxford University Press, 1989.

Velayudhan, S. &Mohanan, K. P., *An Introduction to the Phonetics and Structure of English*, New Delhi: Somaiya Pub. Pvt. Ltd., 1977

QUESTION PAPER PATTERN   **From June 2020 onwards**

LANGUAGE AND LINGUISTICS (CBCS)
Discipline Specific Elective
Semester V –Paper XI (DSE - E15)

Q. 1	Objective type	
	a) Three term labels	(3)
	b) Transcription of words with primary stress	(3)
	c) Conversion of the given transcriptions into the conventional spellings	(2)
Q.2	a) Write short notes (2/3) (to be set on **Module I**)	(10)
	b) Morphological Analysis giving labels (2/4)	(4)
Q.3	a) Identification of word formation/morphological processes	(4)
	d) Identification of word classes	(4)
Q.4.	Write short notes (2/4) (2 each to be set on **Module II & IV)**	(10)

Shivaji University, Kolhapur
B.A. III
English Special
LANGUAGE AND LINGUISTICS (CBCS)
Discipline Specific Elective
Semester VI – Paper XVI (DSE - E140)
From June 2020 onwards

Course Objectives:
- ➤ To acquaint students with structures and functions of words and phrases.
- ➤ To enable students to know and identify elements and types of clauses.
- ➤ To study Subordination and Coordination.
- ➤ To study different ways of structuring clauses.

Course Outcomes:
- ➤ Students know words and phrases.
- ➤ Students know and identify elements and types of clauses.
- ➤ Students know types of sentences.
- ➤ Students know the different ways of structuring clauses

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Semester VI – Paper XVI (DSE - E140)

MODULE V
Phrases
MODULE VI
Clauses
MODULE VII
Subordination and Coordination
MODULE VIII
Basic and Derived Structures
  i)   Inversion / Fronting
  ii. Negation
  iii. Interrogation
  iv. Exclamation
  v. Omission of Certain Elements
      (Relative Pronouns, Comparative Clauses, Tag Questions)
  vi. Passivisation
  vii. Subject Raising
  viii. Style Transformation

Note: Semester VI: 10 Marks for Internal Evaluation: STUDENTS' GROUP PROJECT

Division of Teaching Hours: 4 Modules X 15 Periods = 60 Periods

Reference Books :

    Crystal, David, *Linguistics*, London: Penguin Books Ltd., 1974.

    Hockett, C.F., *A Course in Modern Linguistics*, MacMillan, 1963.

    Hudson, Richard, *Sociolinguistics,*Cambridge: Cambridge University Press, 1996.

    Leech et al, *English Grammar Today: A New Introduction*, Hyderabad: McMillan, 2010.

    Lyons, John, *Language and Linguistics: An Introduction,* Cambridge: Cambridge University Press, 1981.

    Palmer, F. G., *Grammar*, London: Penguin Books Ltd., 1973.

    Quirk, R., Greenbaum, S., Leech, G. &Svartvik, J., *A Comprehensive Grammar of English*, New Delhi: Pearson, 2010.

    Quirk, Randolph &Greenbaum, Sidney, *A University Grammar of English*, New Delhi: Pearson, 2015.

    Radford, A., Atkinson, M., Britain, D., Clahsen, H. & Spencer, A., *Linguistics: An Introduction*, Cambridge: Cambridge University Press,1999.

    Verma, S.K. &Krishnaswamy, N., *Modern Linguistics,* Hyderabad: Oxford University Press, 1989.

QUESTION PAPER PATTERN   **From June 2020 onwards**

LANGUAGE AND LINGUISTICS (CBCS)
Discipline Specific Elective
Semester VI – Paper XVI (DSE - E140)

Q. 1	a) Identify elements of clause (S, P, O, C, A)	(4/6)	(4)
	b)Transformation of sentence (to be set on **Module VIII**)	(4/6)	(4)
Q.2	a) Write short notes. (2 each to be set on **Module V & VI**)	(2/4)	(10)
	b) Give form and function labels to the underlined phrases.	(4/6)	(4)
Q.3	a) Write short notes (To be set on **Module VII**)	(2/3)	(10)
	b) Identify the subordinate clauses and state their form and function.	(4/6)	(4)
Q. 4.	Do as directed. (to be set on **Module VIII**)	(4/6)	(4)

EQUIVALENCE

OLD TITLE	NEW TITLE
THE STRUCTURE AND FUNCTION OF MODERN ENGLISH	LANGUAGE AND LINGUISTICS

SHIVAJI UNIVERSITY, KOLHAPUR

Revised Syllabus for

Bachelor of Arts (Part- III)

SEMESTER V & VI

HISTORY

(Syllabus to be implemented from June 2020 onwards)

EQUIVALANCE OF B.A. III HISTORY SEMESTER- V

Semester	Paper No	Title of Old Paper (June 2015)	Semester	Course No	Title of New Course (June 2020)
V	Paper No. VII	History of Ancient India (From Prehistory to 3rd c. BC)	V	Course No. VII	Early India (from beginning to 4th c. BC)
V	Paper No. VIII	Political History of Medieval India (1206 to 1707 A.D.)	V	Course No. VIII	History of Medieval India (1206-1526 AD)
V	Paper No. IX	India Since Independence –I	V	Course No. IX	Age of Revolutions
V	Paper No. X	History of the Marathas (1707-1818)	V	Course No. X	Political History of the Marathas
V	Paper No. XI	Introduction to Historiography	V	Course No. XI	History: Its Theory

EQUIVALANCE OF B.A. III HISTORY SEMESTER VI

Semester	Course No	Title of Old Paper	Semester	Course No	Title of New Course
VI	Paper No. XII	History of Ancient India (From 3 c. BC to 7th c. AD)	VI	Course No. XII	Ancient India (From 4th c. BC to 7th c. AD)
VI	Paper No. XIII	Socio-Economic and Cultural History of Medieval India (1206 to 1707 A.D.)	VI	Course No. XIII	History of Medieval India (1526-1707 AD)
VI	Paper No. XIV	India Since independence- II	VI	Course No. XIV	Making of the Modern World (16th to 19th Century)
VI	Paper No. XV	Modern Maharashtra (1960 to 2000)	VI	Course No. XV	Polity, Economy and Society under the Marathas
VI	Paper No. XVI	Applications of History	VI	Course No. XVI	Methods and Applications of History

STRUCTURE OF PROGRAMME
REVISED SYLLABUS B.A. PART III (HISTORY)

Sr.No	Semester	Title of Course	Course No.	Credit	Workload	Total Credits	Theory Marks	Term Work/ Seminar
1	V	Early India (from beginning to 4th c. BC)	Course No. VII	04	4 lectures/ Week	20 Credits	40	10
2	V	History of Medieval India (1206-1526 AD)	Course No. VIII	04	4 lectures/ Week		40	10
3	V	Age of Revolutions	Course No. IX	04	4 lectures/ Week		40	10
4	V	Political History of the Marathas	Course No. X	04	4 lectures/ Week		40	10
5	V	History: Its Theory	Course No. XI	04	4 lectures/ Week		40	10

Sr.No	Semester	Title of Course	Course No.	Credit	Workload	Total Credits	Theory Marks	Term Work/ Group Project
6	VI	Ancient India (From 4th c. BC to 7th c. AD)	Course No. XII	04	4 lectures/ Week	20 Credits	40	10
7	VI	History of Medieval India (1526-1707 AD)	Course No.XIII	04	4 lectures/ Week		40	10
8	VI	Making of the Modern World (16th to 19th Century)	Course No. XIV	04	4 lectures/ Week		40	10
9	VI	Polity, Economy and Society under the Marathas	Course No. XV	04	4 lectures/ Week		40	10
10	VI	Methods and Applications of History	Course No. XVI	04	4 lectures/ Week		40	10

SEMESTER VI
B.A. Part III
Semester VI, Course No. XII DSE E-186
Ancient India (From 4th c. BC to 7th c. AD)

Course Objectives: This course explores the history of India from the 4th century BC to the 7th century A.D. It takes a panoramic survey of the historical developments during this crucial period of Indian history. The course studies the eventful changes which took place under the Satavhana, Kushanas, Guptas, Vakatakas , Chalukyas and Pallavas. The students will be introduced to the incomparably vivid picture of India which prevailed during the ancient period. They will be acquainted with not only the glory of Ancient India but also the social inequality and social evils which have shaped India in the past.

Course Outcomes:

After studying the course the student will be able to…

1) Know the political ,economic and religious developments which took place in early historic India

2) Explain the role played by Major Satavahana, Kushana, Gupta and Vakataka Kings

3) Give an account of the developments in the Post-Gupta period

4) Have an informed opinion about the society and culture of Ancient India

Module I: Early Historic India

a)Sources: Gatha Saptashati, Periplus of the Erythraean Sea

b)Major Kings: Satavahana and Kushanas

c)Industry and Trade

d) Hinayana Buddhism

Module II: The Classical Age

a) Major Kings: Guptas and Vakatakas

b)Economy and Greater India

c)Literature and Science

d)Religion

Module III: The Post-Gupta Period

a) Source: Hiuen Tsang

b)North India: Harshavardhana

c) Deccan: Early Chalukyas of Badami

d) South India: Pallavas

Module IV: Society and Culture

a) Position of Women and Varna Structure (From Vedic period to Post-Gupta period)

b) Education

c) Art (From Mesolithic Art to Ajanta Paintings)

d) Architecture- (Rock-Cut Caves (Maharashtra) to Constructed Temples (Madhya Pradesh)

Select Reference Books :

- Jha, D. N. (1977): Ancient India: an introductory outline: People's Pub. House.

- Kosambi, D. D. (1975): An Introduction to the Study of Indian History: Popular Prakashan.

- Majumdar, R. C.; Bharatiya Vidya Bhavan; Bhāratīya Itihāsa Samiti (1951): The History and Culture of the Indian People: The Vedic age: G. Allen 8 Unwin (The History and Culture of the Indian People).

- Sharma, R. S. (1991): Aspects of Political Ideas and Institutions in Ancient India: Motilal Banarsidass.

- Sharma, R. S. (2006): India's Ancient Past: OUP India.

- Sharma, R. S. (2007): Material Culture and Social Formations in Ancient India: Macmillan India.

- Sharma, R. S.; Kumar, D. (2018): Bharat Ka Prachin Itihas: Oxford University Press India.

- Singh, U. (2009): A History of Ancient and Early Medieval India: From the Stone Age to the 12th Century (PB): Pearson India.

- Thapar, R. (2004): Early India: From the Origins to AD 1300: University of California Press.

- Majumdar, R. C.; Altekar, A. S. (1986): Vakataka - Gupta Age Circa 200-550 A.D: Motilal Banarsidass (History and Culture Series).

- Munshi, K. M.; Majumdar, R. C. (1997): The Classical Age: Bharativa Vidya Bhavan (History and culture of the Indian people / General ed.: R.C. Majumdar).

- Sastri, K.A.N. (1958): A history of South India from prehistoric times to the fall of Vijayanagar: Oxford University Press.

- मोतीचंद्र, सार्थवाह, साहित्य अकादमी, नवी दिल्ली , २०१०

- कोसंबी डी. डी., प्राचीन भारतीय संस्कृती आणि सभ्यता , ICHR, डायमंड प्रकाशन, २००६

- थापर रोमिला, अर्लि इंडिया, के सागर पब्लिकेशन, पुणे, २०१३

- थापर रोमिला दी पेंग्वीन हिस्टरी ऑफ अर्लीं इंडिया, के सागर पब्लिकेशन्स, पुणे, २०१८

- वासंती फडके (अनु.), एंशंट इंडिया (प्राचीन भारत) मूळ लेखक शर्मा आर.एस., के सागर पब्लिकेशन, पुणे, २०१५

B.A. Part III
Semester VI, Course No. XIII DSE E-187
History of Medieval India (1526-1707 AD)

Course Objectives : This course explores the history of the Mughal period in India. The Mughals introduced fundamental changes in the polity, economy, society, culture and religion of India. The Bahamani kingdom in the Deccan also split up into five smaller kingdoms during this period. In the course the students will be introduced to the important events, personalities and developments in India. They will know the policies followed by important rulers and will acquaint themselves with the general scenario prevalent in India during the period. They will understand how a syncretic culture developed in India during the period.

Course Outcomes:

After studying the course the student will be able to…

1) Know about the various sources for writing Medieval Indian history

2) Explain the role of rulers like Babar, Akbar, Chandbibi and Ibrahim Adilshah II

3) Gain knowledge about the administrative and revenue system

4) Describe the condition of Industry and trade

5) Explain important developments in religion, society and culture

Module I: Sources

a) Literary: Akbarnama, Gulshan -i -Ibrahimi

b) Archaeological (excluding monuments)

c) Accounts of Foreign Travelers: Francois Bernier, Niccolo Manucci

Module II - Major Rulers

a) Babar: Battle of Panipat and foundation of Mughal empire.

b) Akbar: Rajput policy

 c) Chandbibi

 d) Ibrahim Adilshah II

 Module III- Administration and Economy

a) Administration: Central and Provincial

b) Land Revenue: Akbar and Malik Ambar

c) Industry and Trade

 Module IV: Religion, Society and Culture

 a) Religious Policy: Akbar and Aurangzeb

 b) Society: Hindu and Muslim

 c) Architecture: Mughal and Adilshahi

Select Reference Books:

- Rizvi, S.A.A., The Wonder that was India, Part II, Rupa, Delhi, 2002

- Chitnis, K.N., Glimpses of Medieval Indian Ideas and Institutions, 1974

- Chitnis K. N. Socio- Economic Aspects of Medieval India, Poona, 1979

- Mehta, Jaswant Lal, Advanced Study in the History of Medieval India, Volume I to III, Sterling, New Delhi, 1981.

- Qureshi I.H., The Administration of the Moghal Empire, Delhi, Low Price, Publication 1990

- Raychaudhuri Tapan and Irfan Habib (eds.), Cambridge Economic History of India, Vol. I. C. 1200 C. 1750., Delhi, S. Chand, 1984

- J.F. Richards, The Mughal Empire, Delhi Foundation Books, 1993.

- Satish Chandra, History of Medieval India (800- 1700), Orient Longman, Hyderabad, 2007

- जे. एल. मेहता, क्षीरसागर वि. एस, देशपांडे व्ही. टी, मध्ययुगीन भारताचा बृहत इतिहास , तीन खंड, के' सागर पब्लिकेशन्स, पुणे, २०१७

- Stein, Burton, Vijayanagara , Cambridge University Press, 1989

- M. P. Patil, Court Life under the Vijaynagar Rulers, B.R. Publishing Corporation, 1999

- सतीश चंद्र , वि. एस. क्षीरसागर, मद्ययुगीन भारत – मोगल साम्राज्य १५२६- १७४८, के सागर पब्लिकेशन्स, २०१७

- Salma Ahmed Farooqui, A Comprehensive History of Medieval India, Pearson, 2011.

- के. एन चिटणीस: मध्ययुगीन भारतीय संकल्पना व संस्था, खंड १ ते ४, पुणे, १९८२

- श. गो. कोलरकर: मध्ययुगीन भारताचा इतिहास (१२०६ ते १७०७) , श्री मंगेश प्रकाशन , १९९४

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- डब्ल्यू. एच. मूरलॅन्ड, अबकार कालीन हिंदुस्थान , ICHR, डायमंड प्रकाशन, पुणे, २००६

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B.A. Part III
Semester VI , Course No: XIV. DSE E-188
Making of the Modern World (16th to 19th Century)

     Course Objectives: This course deals with significant events in global history. The primary objective of the course is to introduce the students to the important events which have happened in the world in modern times. These events which were revolutionary in character had a profound impact on the making of the modern world. The students will be acquainted with the events of the Glorious revolution in England. They will understand the causes for the rise and spread of Nationalism and Imperialism. Moreover, they will know about some select important personalities who contributed to the making of the Modern World.

     Course Outcomes:
After studying the course the student will be able to…
1) Know the causes and consequences of the Glorious revolution in England
2) Explain the concept of Nationalism and account for its rise and spread.
3) Describe the unification of Italy and Germany.
4) Give an account of the rise, growth and impact of Imperialism
5) Explain the significance of the Partition of Africa
6) Know the life and thoughts of important leaders like Metternich, Karl Marx and Abraham Lincoln

Module I: Glorious Revolution
a)Causes
b) Major events
c) Consequences

Module II: Nationalism
a) Causes for the rise and spread of Nationalism
b) Unification of Italy and Germany
c) Impact

Module III : Imperialism
a) Causes for rise and growth of Imperialism
b) Partition of Africa
c) Impact on the world

Module IV: Important Personalities
a) Metternich
b) Karl Marx
c)Abraham Lincoln

Select Reference books:
- Arun Bhattacharjee, World Revolutions, Ashish Publishing House, New Delhi, 1988
- L. Mukherjee, A Study of Modern Europe and the World, Calcutta**,** 2011
- David Thompson, Europe Since Napoleon, Penguin books, 1971
- T.C.W. Blanning, The Oxford History of Modern Europe, OUP, 2000

- C.J.H. Hayes, Modern Europe to 1870 , Macmillan, University of Michigan, 1953
- Desmond Seward, Metternich: The First European, Thistle Publishing, 2015
- मदन मार्डीकर, आधुनिक युरोपचा इतिहास इ.स. १७८१ ते १९४५, विद्या बुक्स, २००५
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- कारखानीस सरला, कार्ल मार्क्स चरित्र आणि विचार, जयंत एस भट, १९६०
- बापट राम, कार्ल मार्क्सचा विचार, परामर्श प्रकाशन, १९८४

B.A. Part III
Semester VI, Course No. XV DSE E-189
Polity, Economy and Society under the Marathas

Course Objectives : The objective of the course is to explore the nature of the Maratha polity. It will acquaint the students with the economic and social condition prevalent under Maratha rule. The course will also introduce the students to the sources of Maratha history.

Course Outcomes:
After studying the course the student will be able to…
1) Know the various sources for writing the history of the Marathas
2) Explain the significant developments in the polity of the Marathas
3) Describe the economic conditions
4) Explain the social conditions.

Module I: Sources
a. Importance of sources
b. Indian Sources: Sanskrit, Marathi, Persian
c. Foreign sources : Portuguese and English

Module II: Polity under the Marathas
a. Concept of Kingship
b. Asthapradhan Mandal
c. Transfer of power – Chhatrapati to Peshwa, Peshwa to Karbhari

Module III: Economic condition
  a. Agrarian system – Land Revenue, Irrigation
  b. Industry
  c. Trade and Commerce

Module IV: Social condition
  a. Social Structure - Family , Untouchability, Vethbegar , Slavery.
  b. Condition of women and caste system
  c. Education and Festivals

Select Reference books :

- शेणोलीकर ह.श्री. महाराष्ट्र संस्कृती : घडण आणि विकास, मोघे प्रकाशन, कोल्हापूर, १९७२
- भावे. व. कृ. : शिवराज्य व शिवकाल, भावे प्रकाशन, पुणे, १९५९
- अत्रे. त्र्यं. ना. गाववाडा, राजहंस प्रकाशन प्रा लि., पुणे, २०१८
- वि. गो. खोबरेकर , महाराष्ट्रातील दप्तरखाने: वर्णन आणि तंत्र, १९६८
- कुलकर्णी अ. रा. : शिवकालीन महाराष्ट्र, १९९३ आवृत्ती

- गवळी पा. आ. : पेशवेकालीन समाज व जातीय संगर्ष, १९८२
- गवळी पा. आ., पेशवेकालीन गुलामगिरी व अस्पृश्यता, १९८१
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- गवळी, पा. आ., पेशवेकालीन महाराष्ट्र-संस्था व संकल्पना, कैलास पब्लिकेशन्स औरंगाबाद, २०००
- चापेकर, ना. गो., पेशवाईच्या सावलीत, पुणे, १९३७
- जोशी, एस्. एन्., मराठेकालीन समाजदर्शन, अ. वि. गृह प्रकाशन, पुणे, १९६०
- हेरवाडकर, आर. व्ही., मराठी बखर, व्हीनस प्रकाशन, मुंबई, १९८६
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- Chitnis, K. N., Glimpses of Maratha Socio-Economic History, Atlanta Polishers, New Delhi, 1994
- Choksey, R. D., Economics Life in Bombay Deccan, Asia Publishing House, Mumbai 1955
- Desai, S.V., Social Life in Maharashtra under the Peshwas, Popular Prakashan, Bombay, 1962
- Duff, Grant., A History of Mahrattas, Vol. I to III, Oxford University Press, Calcutta, 3rd ed., 1921
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- Kulkarni, A. R., Maharashtra in the Age of Shivaji (A Study in Economic History), Pune, 1969.
- Mahajan, T. T., Industry, Trade and Commerce during the Peshwa period, Jaipur, 1980
- Kadam V.S. Maratha Confederacy:A study in its origin and development, Munshiram Manoharlal Publishers Pvt Limited , 1993
- Fukazawa, H – The Medieval Deccan: Peasants, Social Systems and States Sixteenth to Eighteenth Centuries, OUP, New Delhi, 1999

B.A. Part III
Semester VI , Course No. XVI DSE E-190
Methods and Applications of History

Couse Objectives: This course has been designed to impart knowledge of the methods of history to the students. The students will understand the nature of archival sources. They will be introduced to the trends of local and oral history and will know about the tools of local history like Survey, Interview and Questionnaire. The students will be introduced to the technique of collecting data through oral interviews. The students will understand the concept of the museum and learn the basic principles of museology. Moreover, the course will introduce the students to the relevance of monumental heritage and its relationship with the discipline of history through the concept of Heritage Tourism

Course Outcomes:
After studying the course the student will be able to…
1) Understand the nature of archival sources
2) Gain conceptual clarity about recent trends in history.
3) Know about the application of history in museums.
4) Explain the concept and scope of heritage tourism.

(**Note: The students should undertake Individual/ Group field projects for assignments in which they could take oral interviews / surveys/ regarding persons, events and local socio-political, economic and cultural developments related to local history. They should make audio recordings of the interviews and develop an archive of local oral history in the college department. These audio interviews would form an important source of local history)**

Module I: Archival Sources
a) Meaning, types, and importance of Archives
b) Types of Records
c) Concept of Digital Archives
Module II: Recent Trends in History
a) Local History
b) Oral History
c) Tools of Local History (Survey, Interview, Questionnaire)
d) Interview Technique
Module III: Museology
a) Definition, Nature and Importance of Museum
b) Types of Museums
c) Methods of Collection, Conservation and Preservation Techniques of Objects

Module IV -Understanding Heritage Tourism
a) Concept, Scope and Significance of Heritage Tourism
b) Meaning and Historical Perspective of Tourism
c) World Heritage Sites in India

Select Reference books:

- B. Shaik, Ali., History:Its Theory and Method, Macmillan India Ltd, Madras, 1978

- Chitnis, K. N., Research Methodology in History, Poona, 1979

- Bajaj, S. K., Research Methodology in History, Anmol Publications Pvt. Ltd., New Delhi, 1998

- Sreedharan, E., A Textbook of Historiography 500 BC to AD 2000, Orient Longman, Hyderabad, 2000

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- Agarwal, O. P. Conservation of Manuscripts and Pantings of South East Asia, London, 1984

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- गायकवाड, आर. डी., सरदेसाई, बी. एन. आणि हनमाने, व्ही. एन. इतिहासलेखन पद्धत व ऐतिहासिक स्मारके यांचा अभ्यास, फडके प्रकाशन, कोल्हापूर, १९८८

- गद्रे, प्रभाकर., इतिहास लेखनाच्या परंपरा, श्री मंगेश प्रकाशन, नागपूर, २००४

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- राजदेरकर, सुहास., इतिहासलेखनशास्त्र, विद्या प्रकाशन, नागपूर, १९९८

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REVISED SYLLABUS OF B. A. III SOCIOLOGY

Choice Based Credit System (CBCS)

Semester – VI, DSE – E191 SOCIOLOGY – XII

INDIAN SOCIOLOGICAL THINKERS

(June 2020 onwards)

A) Course Objectives

Objective of teaching Indian Sociological Thinkers to undergraduate students is to enable them to apply theory to their own Indian Social life experiences. This requires that students develop their sociological imagination and the capacity to read each situation sociologically and then to think about it theoretically. To this end, it is imperative that sociological theory courses demonstrate the

applicability of theory to students.

B) Learning Outcomes:

1. Understanding the characteristics and dynamics of the social world, and how postclassical

sociologists attempt to understand the social world.

2. Appreciating the relevance and limits of the contemporary theories or theoretical

approaches to make sense of social reality.

3. Understanding the basic methodological approaches of the thinkers, through some

original texts and their role in building sociological knowledge.

C) Course Content:

Module	Topic and Sub-Topic	Teaching Hours	Credits
Module -I	**G.S.GHURYE** A) Ideas on National Unity and Interaction B) Study on Caste C) Study on Indian Tribes	**15**	**1**
Module -II	**A.R.DESAI** A) Study of Village Structure in India B) Study of Indian Nationalism C) Analysis of Indian Society through Marxian Perspective	**15**	**1**

Module -III	**M. N. SRINIVAS** A) Concept of Sanskritization B) Concept of Westernization C) Concept of Dominant Caste	**15**	**1**
Module -IV	**IRAWATI KARVE** A) Concept of Kinship Relations B) Hindu Culture: An Interpretation C) Views on Maharashtra	**15**	**1**

D)Teaching learning process:

The students are encouraged to read the original texts and the teacher often participates in the reading process. Thereby the teacher engages in active, rather than passive, pedagogy.

It is important that the classroom sessions, initiated either by the student or the teacher, would encourage teamwork or draw students towards learning, yet there are other means available now which add to that. The use of digital/ICT generated techniques (audio-visual aids).

E)Assessment Methods:

1. Class assignments/term papers, theme(s) of which are chosen following teacherstudent discussion, is one of the ways of assessing the subject and writing skill of the students.

2. Tutorial discussion oral presentations and viva-voce, short individual/team led field studies/projects and seminars/workshops are other modes of assessment. These are included in the Internal Assessment (IA) system.

3. Mid-semester examination is another mode of assessment. Here again, the topic(s) on which the students are to be examined are chosen through teacher-student consultation. Mid-semester examination tests the students on the grasp of the topic(s) in particular and the discipline ingeneral.

4. The end-semester examination is conducted by the university and the student is tested and evaluated on the basis of the entire paper (syllabus). S/he is expected to have a full knowledge of the paper and prescribed readings.

NOTE: Visit to University Library

F) REFERENCES:

1. Nagala B.K. 'Indian Sociological Thought' '

2. V.S.Upadhyay and Gaya Pandey 'History of Anthropological Thought'

3. Narendra K. Singh 'Theory and Ideology in Indian Sociology'

4. T. K. Ommen andP.N. Mukharjee 'Indian Society: Reflections and Introspections'

5. A.R. Desai 'Social Background Of Indian Nationalism'

6. A.R. Desai 'Rural India In Transition'

7. T. N. Madan 'Western Sociologists on Indian Society'

8. Yogendra Singh 'Indian Sociology : Social Conditioning and Emerging Concerns'

9. S.K. Pramanik 'Sociology of G.S. Ghurye'

10. Devdas Pillai 'Indian Sociology Through Ghurye : A Dictionary'

11. A.R. Momin 'The Legacy Of G.S. Ghurye'

12. M.N. Srinivas 'Social Change In Modern India'

REVISED SYLLABUS OF B. A. III SOCIOLOGY
Choice Based Credit System (CBCS)
Semester – VI, DSE – E192 SOCIOLOGY – XIII
METHODS OF SOCIAL RESEARCH (Part-II)
(June, 2020 onwards)

A) Course Objectives
1. The course provides an introductory, yet comprehensive engagement with social research.
2. Through theoretical and practical knowledge students are acquainted with the different stages of the research process like creation of research design, methods of data collection and analysis.
3. The imparted knowledge and training will enable students to develop a sound understanding of both quantitative and qualitative research.

B) Course Learning Outcomes:
1. Students are introduced to the concept of conducting research, which is inclusive of formulating research designs, methods and analysis of data. Some knowledge of elementary statistics is also provided to the students to acquaint them with quantification of data.
2. The thrust of the course is on empirical reasoning, understanding and analysis of social reality, which is integral to the concepts of quantitative research. Students learn to differentiate between qualitative and quantitative aspects of research in terms of collection and subsequent analysis of data.
3. Through the competing theoretical perspectives and methodologies, students are able to understand that social reality is multi-faceted, heterogeneous and dynamic in nature.
4. By imparting the knowledge of theory and praxis of research, students are prepared to arrive at a critical understanding of the course. It also equips them with necessary skills for employment in any social research organization.
3. Periodic tests/mid-semester examination of the covered syllabus is also undertaken by the students during the academic session. End-semester examination is conducted by the University of Shivaji.

C) Course Content:

Module	Topic and Sub- Topic	Teaching Hours	Credits
Module -1	**Sampling and Data collection** a. Meaning and Purpose of Sampling b. Types of sampling c. Advantages and Limitation of Sampling d. Primary and secondary Data collection	15	01
Module -2	**Observation** a. Observation: Meaning and characteristics b. Types of Observation c. Advantages and limitations of observation	15	01

Module -3	**Interview and Questionnaire** a. Interview-meaning and Types b. Advantages and limitations of interview **c.** Questionnaire- meaning and Types **d.** Advantages and limitations of Questionnaire	15	01
Module -4	**Data Analysis and Report Writing** a. Use of computer in data analysis b. Statistical methods c. Report Writing	15	01

D) Teaching-Learning Process:

1. Classroom lectures interlink the sociological theories previously taught with the methods and techniques of data collection. Students are encouraged to construct questionnaires and conduct interviews, use technology like online surveys to develop practical research skills.
2. The use of statistics enables the students to understand both qualitative and quantitative aspects of social research.
3. Alternative pedagogical techniques like outdoor learning through field trips and research projects, audio-visual technology in classrooms provides them with both research related knowledge and experience.

E) Assessment Methods:

1. Tutorials are given regularly to students after the completion of a topic. The objective is to assess the understanding of the student regarding the covered topic.
2. Students are expected to submit individual/team project reports, along with making oral presentations of the same in class.

> **NOTE: Organise Guest Lecture/Seminar on Social Research Methodology**

F)Books for References:

Ahuja Ram: Research Methods, Rawat Publication, Jaipur 2015

Ghosh B.N.: Scientific Methods and Social Research, Sterling Publishers, New Delhi,1982

Kothari C.R.: Research methodology: Methods and Techniques, Wiely Eastern, New Delhi, 1992

Lal Das D.K: Designs of social Research, Rawat Publication, Jaipur,2008

Young P.V.: Scientific Social Surveys and Research, Prentice -Hall of India, New Delhi, Fourth edition fifteen Reprint,2003

संदर्भा साठी ग्रंथ (मराठी)

आगलावे प्रदीप : संशोधन पद्धती: शास्त्र व तंत्रे, विद्या प्रकाशन, नागपूर

घाटोळेरा.ना.: सामाजशास्त्रीयसंशोधन -पद्धती आणि तत्त्वे, मंगेश प्रकाशन नागपूर,

बोधनकर सुधीर : सामाजिक संशोधन पद्धती,साईनाथ प्रकाशन,नागपूर

रानडे पुष्पा : प्राथमिक सांखिकी आणि संसोधन पद्धती,डायमंड प्रकाशन, पुणे, २०१५

REVISED SYLLABUS OF B. A. III SOCIOLOGY
Choice Based Credit System (CBCS)
Semester – VI, DSE – E193 SOCIOLOGY – XIV
SOCIAL ANTHROPOLOGY
(June, 2020 onwards)

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1. To provide the conceptual understanding about anthropology
2. To understand the social aspects of tribal's in India.

	Topic	Teaching Hours	Credits
Model - I	**INTRODUCTION TO SOCIAL ANTHROPOLOGY** A) Social Anthropology: Meaning and Characteristics B) Relation Between Social Anthropology and Sociology C) Field work Method and its Characteristics D) Importance of Social Anthropology	**15**	**1**
Model – II	**TRIBAL SOCIETY IN INDIA** A) Tribal Society : meaning and Characteristics B) Social life : Family ,and Marriage - Characteristics C) Economic Life : Characteristics D) Religious Life : Beliefs and practices	**15**	**1**
Model – III	**TRIBAL PROBLEMS** A) Poverty and Indebtedness B) Land Alienation C) Illiteracy and Exploitation D) Religious Crisis	**15**	**1**
Model - IV	**Tribal Community in Maharashtra: Pardhi** A) Socio-Cultural life : Tradition and Change B) Economic life : Tradition and Change C) Religious life : Tradition and Change D) Social Movements for Development of Pardhi Community	**15**	**1**

NOTE: Visit to Any Tribal and Nomadic Tribe Community

REFERENCE:-
Vidyarthi L.P. Tribal Culture of India, Concept Publishers,New Delhi, 1976.
E.E. Evans Pritchard Social Anthropology and Other Essays, The free Press, NewYork, 4962.
Mujumdar D.N. andMadam T.N An Introduction to Social Anthropology, Asia Publishing House,Bombay,1973.
संगवे विलास सामाजिक मानवशास्त्र, पॉप्युलर प्रकाशन, मुंबई, १९६९
नाडगोंडे गुरुनाथ भारतीय आदिवासी, कॉन्टीनेंटल प्रकाशन, पुणे, १९९८
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K. S. Tribal Situation in India, Indian Institute of Advanced Study, Simla, 1972.
S.L. Doshi & P. C.Jain
Social Anthropology Rawat Publicaiton, 2001.
Mane Lximan ,Vimuktayan ,Yashvantrav chavan prtishthan,Satara 1994(Marathi)
Prabhune Girish,Pardhi,Rajhans Prakashan,pune.2006 (Marathi)

Pawar Deepak,Pardhi Samajache Antrang,
   Shree Sainath Prakashan,Nagapur.2014(Marathi)
Chavan Ramnath,Bhatakya vimukantanchi Jatpanchayat,Deshmukh ani company Pune.2006(Marathi)

Journals:
 i) *हाकारा* (Hakara)
ii) Social Change (New Delhi)
iii) Man in India (Ranchi)
iv) Tribal research bulletin (Marathi and English)
Tribal Research Institute Pune.
v) Human Ecology : Journal of manenvironmental relationship Kamlaraj, Enterprises Delhi.
Ritzer George Sociological Theory, Tata Mcgraw Hill, 1996
Morrison, Ken Marx,
Durkheim, Weber
Formation of Modern Social Thoughts,Sage london 1995.

REVISED SYLLABUS OF B. A. III SOCIOLOGY
Choice Based Credit System (CBCS)
Semester – VI, DSE – E194 SOCIOLOGY – XV
RURAL SOCIOLOGY
(June, 2020 onwards)

A) Course Objectives:

1. To communicate Agriculture as the foundational material practices at the heart of the formation of social collectivities and make sense of South Asian societies agrarian formations.
2. To familiarize students with rural situation past and present with the help of necessary theories and categories.
3. To make sense of rural communities, their structure, transformation and trials and tribulations in modern world.
4. To introduce students to the rich legacy of theoretical and empirical work in rural sociology and its continued relevance.

A) Course Learning Outcomes:
1. An empathy for and ability to engage rural communities as living societies and understand grasp they condition as human condition.
2. An appreciation of rural world and familiarity with the trajectory of theoretical conversation on rural issues and their social, political and policy implications.
3. An understating of emerging as well as enduring issues of concern in Indian rural society
4. To be ready for a range of academic and professional roles that may require a knowledge of rural societies.

C) Course Content:

Module	Topic and Sub- Topic	Teaching Hours	Credits
Module -1	**Introduction to Rural Sociology** A) Meaning of Rural Sociology B) Origin, Scope and Subject Matter of Rural Sociology C) Importance of Rural Sociology with the reference of India	**15**	**01**
Module-2	**Indian Rural Community** A) Village studies in India B) Classification of Indian Villages C)Changing Nature of Rural Community in India	**15**	**01**

Module -3	**Social Institutions in Rural Society** A) Marriage, Family and kinship Institution B) Caste and Balutedari C)Political life : structure and change	15	01
Module-4	**Changing Indian Agrarian Society** A) Rural Cooperative and Rural Industry B)Markets, Land Reforms and Green Revolution C)The Agrarian Issues	15	01

D) Teaching Learning Process:

The teaching learning for this course involves lectures, tutorial conversations around contemporary issues of concern for agrarian societies and extensive usage of imaginative literature and films that makes the lived world of peasantry and rural communities come alive to the students.

E) Assessment Methods:

Recommended evaluation would be an assignment that tests the conceptual grasp of the students and a project that prompts students to engage in research about a historical or contemporarily rural issue.

> **NOTE: Visit to village and Grampanchayat and Understand its Structure and Rural Development Programs**

F) References:(English)

BeteilleAndre: Caste, Class and Power, Oxford University press, (India),New Delhi, (2012).

Beteille Andre: 'The Study of Agrarian Systems: An Anthropological Approach', from Marxism and Class Analysis, New Delhi: Oxford. 2007.

Bandopadhyay :'Reflections on Land Reform in India since Independence' from T. V. Satyamurthy (Ed.) Industry and Agriculture in India Since Independence, Delhi: Oxford University Press.

Desai A.R.: Rural Sociology in India Popular Prakashan, Bombai,(1969 reprint 2009) .

Dhanagare, D. N.: 'Green Revolution and Social Inequalities in Rural India' from, Economic and Political Weekly, Vol. 22, No. 19/21, Annual Number (May, 1987),

Dube SC: Indian Village, Routledge,New York, (Second edition 2018)

Mukherjee Ramkrishna: The Dynamics of a Rural Society, Akademie -Verlag, Berlin, (1957)

OOmmen T.K.: Green Revolution and AgarinConflicts, Economics and Political weekly, Vol.-6,Issue-26(1971)

Shah, A.M.: Changes in the Indian Family: An Examination of Some Assumptions', in The Family in India: Critical Essays, New Delhi: Orient Longman (1998)

Srinivas M.N.: India: Social Structure, Hindustan Publishing Corporation, Delhi (1980)

मराठी ग्रंथ

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REVISED SYLLABUS OF B. A. III SOCIOLOGY

Choice Based Credit System (CBCS)

Semester – VI, DSE – E195 SOCIOLOGY – XVI

URBAN SOCIOLOGY

(June,2020 onwards)

A)Course Objectives:

1. Urbanization is an important aspect of modern society. This course is will provide an

Exposure to key theoretical perspectives for understanding urban phenomena in historical

and contemporary contexts.

2. It also reflects on vital concerns of urban living while narrating the subjective experiences

of urban communities. With case studies from India and other parts of the world this

course will help students understand and relate to the complexities of urban living.

3. The course seeks to evolve critical thinking and develop a policy perspective on the

urban.

B)Course Learning Outcomes:

1. To appreciate the significance of the city and the process of urbanization and its

Consequences across the globe, through cross disciplinary texts and ethnographic studies.

2. To understand the urban in the historical as well as modern contexts - the idea of

Urbanism and urban space and the intersections in these of institutions, processes and

Identities. This is to be achieved by exposing students to critical theoretical debates which

help them to gain a deeper understanding of city life and urban environment which can

Also help them understand their own social environment better.

3. To learn about key urban processes such as migration, displacement and urban slums, as

Well as critical contemporary issues such as resettlement and rehabilitation and also engage in issues of public policy, urban transformation and change. Knowledge of such Themes will help students pursue further studies in academic areas such as development and also engage in research on public policy, urban transformation and change.

4. To develop critical thinking and a reflective perspective through exposure to multicultural Thought; to enhance disciplinary knowledge, research-related skills and develop a problem-solving competence.

C) Course Content:

Module	Topic and Sub- Topic	Teaching Hours	Credits
Module I	Introduction to Urban Sociology A) Definition, Meaning & Nature of Urban Sociology. B) Subject Matter of Urban Sociology. C) Importance of the Study of Urban Sociology	15	01
Module II	Major Concepts in Urban Sociology. A)Urban Community. B)Urbanism. C)Rural- Urban differences- continuum	15	01
Module III	Process of Urbanization A) Meaning and Nature of Urbanization	15	01

	B) Causes of Urbanization. C) Consequences of Urbanization		
Module IV	Urban Social Structure. A) Urban Family : Characteristics and Change B) Urban Social stratification: Caste & Class. C) Urban Occupations: Characteristics and Change	15	01

D) Teaching Learning Process:

The sociology of the urban is simultaneously theoretical and yet deeply experiential.The teachinglearning for this course necessarily has to be deliberative, drawing from the multicultural exposure to city living. There will be an emphasis on blended learning supported by debates anddiscussions. Classroom lecturesshall be supplemented by power point presentations and film screenings onvarious contemporary urban issues. Invited lectures by policy makers, activists,practitioners and other stake holders would be integral to the curriculum. Students wouldbe encouraged to set out into the field to grasp issues with greater clarity. City walks will be encouraged to enrich the experiential understanding of the urban. Learning would also involve a multi-disciplinary perspective, collaborating with other social sciences that engage with the urban as well as the disciplines of urban planning and architecture, in order to enhance problem solving and critical thinking ability.

E) Assessment Methods:

Assessment for this paper would be in the form of tests, written assignments, projects' reportsand presentations.

F) Key Words:

Urban, Urbanism, Urbanisation, City, Migration, Settlement, Space, Ecology.

NOTE: 1) Visit to any Slum Area in City and Understand their Problems

2) Visit to any City and Observe its Ecosystem

G) References:-

1. Wilson R.A & Schlutz David   : Urban Sociology, Prentice Hall, England, 1978

2. Rao M.S.A.   : Urban Sociology in India, Orient Longman

     New Delhi, 1974.

3. D Souza Alfred   : The Indian city: Poverty Ecology and Urban

     Development, Manohar, New Delhi,1978.

4. Dube K.K. and Singh A.K.   : Urban Environment in India, Inter India, New Delhi

     1980.

5. Mitra, Ashok et.al.   : Indian cities, abhinav, New Delhi,1980.

6. Berge E.E.   : Urban Sociology, Free Press, New York,1962

7. Bose, Ashish   : Studies in India's Urbanisation, Tata McGraw Hill,

     New Delhi,1973

8. Singh Pramod   : Ecology and Urban India, Vol.II Ashish, New

Delhi, 1987.

9. Urban Sociology   : Rajendra K. Sharma Atlantic Publishers &

Distributers, New Delhi,1997

10. Urbanization   : Concept & Growth: A.K. Shrivastava,

H.K.Publishers and Distribtors, New Delhi,1989

B.A. Sociology Outcome

Sociology is the most contemporary and versatile of the Social Sciences. It trains students to grasp social structures, understand social processes map the dynamics of social change, decipher social interactions and make sense of individual and collective experiences in their social, historical and cultural context. Sociology is at once critical and constructive; conceptual and applied; theoretical and empirical. It is a science that cohabits comfortably with literary flair, speculative sensibility, historical imagination and statistical rigour. It is incessantly reflexive about its methods, demanding about its research techniques and standards of evidence. Sociology is ever so subtle about the conceptual distinctions it draws and zealous about its disciplinary boundaries and identity. At the same time, sociology is the most open and interdisciplinary of social sciences. The Pursuit of sociology is a systematic effort at recovering, mapping and making sense of our kaleidoscopic collective self under the sign of modernity. It is both historical and comparative. Sociology as an academic discipline is committed to the ideal of generating public knowledge and fostering public reason. It embodies best of enlightenment virtues: scientific reason, tolerance of diversity, humanistic empathy and celebration of democratic ideals. It is the science of our times.

Teaching Learning Process

Multiple pedagogic techniques are used in imparting the knowledge both within and outside the classrooms. Listed below are some such techniques:

➢ Lectures

➢ Tutorials

➢ Power-point presentations

➢ Project work

➢ Documentary Films on relevant topics

➢ Debates, Discussions, Quiz

➢ Talks /workshops

- Interaction with experts

- Academic festivals

- Classics and other sociologically meaningful films

- Excursions and walks within the city

- Visit to the museums

- Outstation study tours ….. Survey designs

- Internships

A note on Assessment Methods

Besides the formal system of University exams held at the end of each semester as well as mid-semester and class tests that are held regularly, the students are also assessed on the basis of the following:

- Written assignments

- Projects Reports

- Presentations

- Participation in class discussions

- Ability to think critically and creatively to solve the problems

- Application of classroom concepts during fieldwork

- Reflexive Thinking

- Engagement with peers

- Participation in extra and co-curricular activities

- Critical assessment of Films /Books etc.

A note on career trajectories for Sociology Graduates and (for) Prospective employers:

Students with a grounding in Sociology have contributed immensely to the following
fields :

➢ Academics
➢ Bureaucracy
➢ Social Work
➢ Law
➢ Journalism both print and visual
➢ Management
➢ Policy Making
➢ Developmental Issues
➢ Designing and Conducting surveys
➢ Human Resource Development
➢ Competitive Examinations
➢ Advocacy
➢ Performing Arts
➢ Research in contemporary issues of Gender, Development, Health, Urban Studies,
  Criminology etc.

SHIVAJI UNIVERSITY, KOLHAPUR

Revised syllabus for
Bachelor of Arts (Part – III)

SEMESTERV & VI

ECONOMICS

Syllabus to be implemented from June 2020 onwards

Equivalance B.A.III Economics Sem- V

Sem No.	Paper No.	Title of Old Paper	Sem No.	Discipline	Title of New Paper
V	VII	Micro Economics	V	Economics Course - 7	Principles of Micro Economics- I
V	VIII	Research Methodology in Economics (Part I)	V	Economics Course- 10	Research Methodology in Economics- I
V	IX	History of Economic Thoughts (Part I)	V	Economics Course - 11	History of Economic Thoughts- I
V	X	Economics of Development	V	Economics Course - 8	Economics of Development
V	XI	International Economics (Part I)	V	Economics Course - 9	International Economics- I

Equivalance B.A.III Economics Sem- VI

Sem No.	Paper No.	Title of Old Paper	Sem No.	Economics Course	Title of New Paper
VI	XII	Market and Pricing	VI	Economics Course- 12	Principles of Micro Economics- II
VI	XIII	Research Methodology in Economics (Part II)	VI	Economics Course- 15	Research Methodology in Economics- II
VI	XIV	History of Economic Thoughts (Part II)	VI	Economics Course- 16	History of Economic Thoughts- II
VI	XV	Economics of Planning	VI	Economics Course- 13	Economics of Planning
VI	XVI	International Economics (Part II)	VI	Economics Course- 14	International Economics- II

Structure of Course
Revised syllabus of B.A. Part III (Economics)

Sr. No.	Semester	Title of the Paper	Discipline	Distribution of Credit	Workload	Total Credits	Theory Marks	Term work seminar
1	V	Principles of Micro Economics- I	Economics Course- 7	4	4 Lectures / week		40	10
2	V	Economics of Development	Economics Course- 8	4	4 Lectures / week		40	10
3	V	International Economics- I	Economics Course- 9	4	4 Lectures / week	20	40	10
4	V	Research Methodology in Economics- I	Economics Course- 10	4	4 Lectures / week		40	10
5	V	History of Economic Thoughts- I	Economics Course- 11	4	4 Lectures / week		40	10

Sr. No.	Semester	Title of the Paper	Discipline	Distribution of Credit	Workload	Total Credits	Theory Marks	Term work Group Project
6	VI	Principles of Micro Economics- II	Economics Course- 12	4	4 Lectures / week		40	10
7	VI	Economics of Planning	Economics Course- 13	4	4 Lectures / week		40	10
8	VI	International Economics- II	Economics Course- 14	4	4 Lectures / week	20	40	10
9	VI	Research Methodology in Economics- II	Economics Course- 15	4	4 Lectures / week		40	10
10	VI	History of Economic Thoughts- II	Economics Course- 16	4	4 Lectures / week		40	10

B. A. III Economics (Semester VI) (CBCS Pattern)

Principles of Micro Economics- II

(Elective Course- 12) DSE E 196

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

- Identify the market structure
- Analyse the economic behaviour of individual firms and markets
- Analyse a firm's profit maximising strategies under different market conditions
- Understand the factor pricing

Module- I Perfect Competition   **(Teaching Hours- 15, Credits- 01)**

    1.1   Meaning and characteristics
    1.2   price and outputdetermination under perfect competition
    1.3   Equilibrium of the firm and industry in the short run
    1.4   Equilibrium of the firm and industry in the long run

Module- II Monopoly   **(Teaching Hours- 15, Credits- 01)**

    2.1   Meaning and characteristics

    2.2   Price discrimination and degrees

    2.3   Equilibrium of a monopoly firm in the short run and long run

    2.4   Monopoly and capacity loss

Module- III Imperfect Competition   **(Teaching Hours- 15, Credits- 01)**

    3.1   Meaning and characteristics

    3.2   Price- output determination

    3.3   Product differentiation

    3.4   Oligopoly and duopoly- meaning and characteristics

Module- IV Factor Pricing   **(Teaching Hours- 15, Credits- 01)**

    4.1   Marginal productivity theory

    4.2   Modern theory of rent

    4.3   Classical and Keynesian theory of interest

    4.4   Risk and uncertainty theory of profit

BASIC READING LIST:

1.   Dominic Salvator (2012) – Principles of Micro Economics, 5th edition, Oxford University Press, Oxford.
2.   John B. Taylor & Akila Weerapana, (2011) 'Principles of Economics', 7th Edition, Cengage Learning, India, New Delhi.

3.   Koutsoyiannis, A. (1979), Modern Microeconomics, 2nd Edition, Macmillan Press, London.

4.   Lipsey Richard G., (latest edition), An Introduction to Positive Economics, Weidenfeld & Nicolson, London.

5.   Lipsey, R.G. and K.A. Chrystal (latest edition), Principles of Economics (IX Ed.), Oxford University Press, Oxford.

6.   Mankiw, N. Gregory (2008),Principles of Microeconomics, 5th Edition, Cengage Learning India, New Delhi.

7.   Mansfield, E (latest edition), Microeconomics (9th Ed) W.W. Norton and Company, New York.

8.   Pindyek and Rubinfield (latest edition)- Micro Economics, Pearson Education, New Delhi.

9.   Ray, N.C. (latest edition), An introduction to Microeconomics, Macmillan company of India Ltd.

10. Samuelson, P.A. and W.D. Nordaus (latest edition), Economics, Tata McGraw Hill, New Delhi.

11. Stonier, A.W. and D.C. Hague (latest edition), A Textbook of Economic Theory, ELBS and Logman Group, London.

12. Varian, Hall (1992): Microeconomic Analysis, Third Edition, W. W. Norton & Company, Inc, New York.

B. A. III Economics (Semester VI) (CBCS Pattern)
Economics of Planning
(Elective Course- 13) DSE – E 197

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

- Get acquainted with economic planning and its importance in development
- Get acquianted with development of planning and planning machinery in India
- Evaluate sectoral performance of the Indian economy
- Compare and analyse Indian models of economic development

Module- I: Introduction to economic planning   (Teaching Hours- 15, Credits- 01)
- 1.1   Meaning, Case for and against economic planning
- 1.2   Genesis of planning
- 1.3   Types of planning
- 1.4   Conditions of success of planning

Module- II: Issues in economic planning   (Teaching Hours- 15, Credits- 01)
- 2.1   The choice of techniques: labour and capital intensive
- 2.2   Capital output ratio: Importance and factors affecting COR
- 2.3   Input output analysis
- 2.4   Project evaluation

Module- III: Planning in India- I   (Teaching Hours- 15, Credits- 01)
- 3.1   Evolution of planning in India
- 3.2   Objectives and evaluation of planning
- 3.3   Planning Commission and National Development Council
- 3.4   NITI Ayog- Need for establishment, organization, objectives and work

Module- IV: Planning in India- II   (Teaching Hours- 15, Credits- 01)
- 4.1   Plan models in Indian plans
- 4.2   Agricultural development under plans
- 4.3   Industrial development under plans
- 4.4   Services sector development under plans

BASIC READING LIST:
1. Behrman, S. and T.N. Srinivasan (1995), *Handbook of Development Economics*, Vol. 1to 3, Elsevire, Amsterdam. Economics 31
2. Hayami, Yujiro and Yoshihisa Godo (1997), *Development Economics*, Oxford University Press, New York.
3. Kindleberger, C.P. (1965), *Economic Development*, 3e, McGraw Hill, New York.
4. Meier, Gerald M. and James E. Rauch (2005), *Leading Issues in Economic Development*, 6e, Oxford University Press, New Delhi.
5. Myint, Hla (1971), *Economic Theory and Under Developed Countries*, Oxford University Press, New York.
6. Thirlwal, A.P. (1999), (6th Edition), *Growth and Development*, Macmillan, London.

7. Bhagwati, J. and P. Desai (1970), *India : Planning for Industrialization*, Oxford University Press, London.
8. Brahmananda, P.R. and C.N. Vakil (1956), *Planning for an Expanding Economy,* Vora and Co., Bombay.
9. Puri V. K. And S. K. Misra (2016), *Economics of Development and Planning*, Himalaya Publishing House.
10. Datta Gaurav and Ashwini Mahajan (2016), *Indian Economy*, S. Chand Publishing, New Delhi
11. Chakravarty, Sukhamoy (1987), *Development Planning : The Indian Experience,* Clarendon Press, Oxford.
12. Jhingan, M.L. (2005) *The Economics of Development and Planning* , Vrinda Publications Ltd. Delhi
13. Lekhi, R.K. (2005) *Economics of Development and Planning*, Kalyani Publishers, Delhi.
14. Patil, J. F. (et al) (2005) *Economics of Growth and Development* (Marathi) , Phadake Publishers, Kolhapur.
15. Patil, J.F. & Tamhankar, P.J. (1990) *Economics of Development and Planning* (Marathi), Continental Publishers, Pune.

B. A. III Economics (Semester VI) (CBCS Pattern)

International Economics- II
(Elective Course- 14) DSE – E 198

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

- Distinguish between balance of trade and balance of payments
- Analyse the balance of payments
- Understand the various types of foreign capital
- Analyse the impact of international institutions on Indian economy

Module- I: Balance of Trade and Balance of Payments(Teaching Hours- 15, Credits- 01)

1.1   Balance of Trade and Balance of Payments

1.2   Importance of Balance of Payments

1.3   Disequilibrium in Balance of Payments: Causes and Consequences

1.4   Measures to correct disequilibrium in Balance of Payments

Module- II: Foreign Trade of India since 1991   (Teaching Hours- 15, Credits- 01)

2.1   Volume, composition and direction

2.2   Exim Policy of 2014-19

2.3   Trade administration of India

2.4   Convertibility of Rupee: Meaning and types.

Module- III: Foreign Capital in India   (Teaching Hours- 15, Credits- 01)

3.1   Need for Foreign Capital

3.2   Types of Foreign Capital

3.3   Foreign Capital Policy of Government of India

3.4   Trends in Foreign Direct Investment in India

Module- IV: International Institutions and India   (Teaching Hours- 15, Credits- 01)

4.1   IMF: Objectives and Functions

4.2   IBRD: Objectives,Functions

4.3   ADB: Objectives, Functions

4.4   WTO: Objectives, Functions

BASIC READING LIST:

1   Aggarwal, M. R. (1979), Regional Economic Cooperation in South Asia, S. Chand and Co., New Delhi.
2   Bhagwati, J. (Ed.) (1981), International Trade, Selected Readings, Cambridge University Press, Mass.
3   Crockett. A. (1982), International Money: Issue and Analysis, ELBS and Nelson, London.

4   Greenaway. D. (1983), International Trade Policy, MacMillan Publishers Ltd., London.
5   Heller, H. R. (1968), International Monetary Economics, Prentice Hall. India.
6   Joshi V. and I.M.D. Little (1998), India's Economic Reforms, 1999-2001, Oxford
7   Kenan, P.B. (1994), The International Economy, Cambridge University Press, London.
8   Kindlberger, C. P. (1973), International Economics, R.D. Irwin, Homewood.
9   Krugman, P. R. and M. Obstgeld (1994), International Economics: Theory and Policy, Glenview, Foresman.
10   Mithani D.M. (Reprint-2009) International Economics, Himalaya Publishing House, New Delhi.
11   Nayyar,D. (1976) : India's Exports and Export Policies in the 1960s, Cambridge University Press, Cambridge.
12   Panchmukhi, V. R. (1978), Trade Policies of India: A Quantitative Analysis, Concept University Press, Delhi.
13   Patel, S. J. (1995), Indian Economy Towards the 21st Century, University Press Ltd., India.
14   RuddarDatt& K.P.M. Sundaram, (2018), Indian Economy, S. Chand & Co. Ltd., New Delhi
15   Salvatore, D. L. (1997), International Economics, Prentice- Hall, Upper Saddle River, N. J.
16   Singh, M. (1964), India Export Trends and the Prospects for Self-sustained Growth, Oxford University Press, Oxford.
17   Sodersten, Bo (1991), International Economics, MacMillan Press Ltd. London

B. A. III Economics (Semester VI) (CBCS Pattern)

Research Methodology in Economics- II
(Elective Course- 15) DSE – E - 199

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

- Understand the sampling techniques as a method of data collection
- Use techniques of data analysis in research
- Write a research report and thesis
- Write a research proposal (grants)

Module- I: Sampling (Teaching Hours- 15, Credits- 01)

1.1   Meaning and nature

1.2   Types of sampling

1.3   Criteria of good sampling

1.4   Optimum size of sampling

Module- II: Processing and representation of data   (Teaching Hours- 15, Credits- 01)

2.1   Classification of data

2.2   Tabulation of data

2.3   Percentage

2.4   Graphs and diagrams

Module- III: Techniques of data analysis   (Teaching Hours- 15, Credits- 01)

3.1   Need and importance of data analysis

3.2   Measures of central tendency: mean, mode, median (direct method)

3.3   Measures of variation: range, standard deviation (direct method)

3.4   Correlation- meaning and importance, Karl Pearson's coefficient of   correlation

Module- IV: Interpretation of data and report writing(Teaching Hours- 15, Credits- 01)

4.1   Interpretation of data: meaning

4.4 Report writing: meaning, steps, precautions

4.5   Properties of good report writing

4.4   Writinga good research proposal

BASIC READING LIST:

1. Goode and Hatt (1981), Methods in Social Research, McGraw Hill International Book Company, New Delhi.
2. Kerliger F.N.(1983), Foundation of Behavioural Research, Surjeet Publication,Delhi.
3. Young P. V.(1960), Scientific Social Survey and Research, Asia Publication House,Mumbai.
4. Kothari C.R. (1993), Research Methodology-Methods and Techniques, Wiley Eastern Ltd.,New Delhi.
5. Lundbrg G.A.(1960), Social Research, Longmans Green and Company, New York.
6. Herekar P .M.(2019), Research Methodology and Project Work, Phadake Prakashan,Kolhapur.
7. Settiz Claire,Jahoda Marie and Others(1959), Research Methods in SocialResearch,Dryden New York.
8. Takur Dvendra (1997), Research Methodology in Social Sciences, Deep and Deep Publication,New Delhi.
9. Gupta S.P.and Gupta M.P.(2005), Business Statistics, Sultan Chand & Sons, New Delhi
10. Gupta C.B. (1996), An Introduction to Methods, Vikas Publication House,New Delhi.
11. देशमुख राम (जून 2005) : 'मूलभूत सांख्यिकी', विद्या प्रकाशन, नागपूर.
12. पाटील ज.फा., पठाण के.जी., ताम्हणकर पी.जे., संतोष यादव (2012) : 'अर्थशास्त्रीय संशोधनाची तोंडओळख', (सुधारित आवृत्ती), कॉन्टिनेंटल प्रकाशन, पुणे.
13. आगलावे प्रदीप (जानेवारी 2000) : 'संशोधन पध्दतीशास्त्र व तंत्रे', विद्या प्रकाशन, नागपूर.
14. खैरनार दिलीप (फेब्रुवारी 2009) : 'प्रगत सामाजिक संशोधन पध्दती व सांख्यिकी', डायमंड पब्लिकेशन्स, पुणे.
15. भांडारकर पु.ल. (1987) : 'सामाजिक संशोधन पध्दती', महाराष्ट्र विद्यापीठ ग्रंथनिर्मिती मंडळ, नागपूर.

B. A. III Economics (Semester VI) (CBCS Pattern)

History of Economic Thoughts- II
(Elective Course- 16) DSE – E 200

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

- Understand the economic concepts and theories of Neo-Classical and Indian thinkers.
- Understand the development of economic thoughts

Module- I: Neo- Classical Economic Thought – Alfred Marshall

(Teaching Hours- 15, Credits- 01)

1.1 Theory of Value
1.2 The concept of representative firm
1.3 Consumer's surplus, elasticity of demand
1.4 Quasi rent

Module- II: Indian Economic Thought   **(Teaching Hours- 15, Credits- 01)**

2.1 Mahatma Phule: Views on agriculture and education
2.2 Rajarshi Shahu Maharaj: Policy for agriculture development and co-Operation
2.3 Dr. Babasaheb Ambedkar: Views on money, agriculture and development policy
2.4 Dadabhai Nauroji: Drain theory

Module- III: Mahatma Gandhi   **(Teaching Hours- 15, Credits- 01)**

3.1 Concept of village development
3.2 Importance of decentralization
3.3 Basic principle of development: swadeshi
3.4 Concept of Gram Swarajya

Module- IV: Economic Thoughts of Modern Indian Economist

(Teaching Hours- 15, Credits- 01)

4.1 Gopal Krishna Gokhale's views on public finance
4.2 D. R. Gadgil: Views on co-operative development and decentralization of power, co-operative commonwealth
4.3 V. M. Dandekar: Views on poverty
4.4 Amartya Sen: Concept of social choice, choice of techniques, Sen's views on poverty and public action

BASIC READING LIST:

1. Dandekar V.M.and N.Nath (1971), Poverty in India, Indian school of political Economy, Pune.

2. Ganguli B. N. (1977): Indian Economic Thought - A 19th Century Perspectives,Tata Mc Grow Hill, New Delhi.

3. Rath Nilkanth(1995) V.M.Dandekar Social Scientist with a Difference : Journal of Indian School of Political Economy.Oct-Dec.1995, Vol-7 No-4.

4. Seshadri G.B.(1997): Economic Doctrines, Publishing Corporation, New Delhi.

5. चा.भ.खैरमोडे (१९७८) – डॉ.भीमराव रामजी आंबेडकर, खंड १ ला , खंड २ रा खंड ७ वा, प्रताप प्रकाशन.

6. गांधी मो.क.(१९९७) -मराठी अनुवाद सीताराम पुरोषोत्तम पटवर्धन'सत्याचे प्रयोग अथवा आत्मकथा पाचवी आवृत्ती.

7. डॉ.जे.एफ.पाटील (२०१५)– आर्थिक विचारांचा इतिहास, फडके प्रकाशन, कोल्हापूर.

8. इंगळे बी.डी. (२०११) आर्थिक विचारांचा इतिहास, अरुणा प्रकाशन, लातूर.

9. प्रा.रायखेलकर,डॉ.दामजी (२०११) – आर्थिक विचारांचा इतिहास, विद्या बुक पब्लिशर्स,औरंगाबाद.

10. प्रा.डॉ.अनिलकुमार वावरे, प्रा.संजय धोंडे, व डॉ.अनिल सत्रे (२०१४)– आर्थिक विचारांचा इतिहास, एज्युकेशनल पब्लिशर्स अॅन्ड डिस्ट्रिब्युटर्स,औरंगाबाद.

11. प्रा.रा.म.गोखले - आर्थिक विचारांचा इतिहास

12. डॉ.विजय कविमंडन - आर्थिक विचारांचा इतिहास

SHIVAJI UNIVERSITY, KOLHAPUR.

Accredited By NAAC with 'A' Grade

Revised Syllabus For

B.Sc Part- III

Chemistry

Syllabus to be implemented from

June, 2020 onwards.

Laboratory Course (Practicals)

N. B. (i) Use of Digital/Analytical/Chainometric/Single pan balance is allowed.

(ii) Use of Scientific calculator is allowed.

(iii) Use of Chart/Text book/Hand book of practical is allowed.

(iv) There will be a project having weightage of 15 marks.

Project should be in the following areas but focused on applications of Chemistry.

a) Society oriented

b) Daily use

c) Industry based

d) Analysis based

The project will be assessed by all the three examiners with equal weightage at the time of practical examinations.

The project may be completed individually or by a group of students not exceeding number three.

One copy of the project should be submitted at the time of examination. After assessment this copy will remain in the department.

INORGANIC CHEMISTRY

I) Gravimetric Estimations (G).

N. B. Any **two** experiments from G1 to G3 and any **two** experiment from G4 & G6.

G1. Gravimetric estimation of iron as ferric oxide (Fe_2O_3) from the given solution

containing ferrous ammonium sulphate, copper sulphate and free sulphuric acid.

G2. Gravimetric estimation of zinc as zinc pyrophosphate from the given solution

carbon tetrachloride and calculate the refraction equivalents of C, H and Cl atoms.

D. Colorimetry (Any Two).

1. To verify Lambert – Beer's law using $CuSO_4$ solution.

2. To estimate of Fe^{+++} ions by thiocynate method.

3. To estimate Fe^{+++} ions using salicylic acid by colorimetric titration.

4. To determine the order of reaction for the oxidation of alcohol by potassium dichromate and potassium permanganate in acidic medium colorimetrically.

E. pH – metry (Any One).

1. To determine the dissociation constant of monobasic acid (Acetic acid).

2. To determine the dissociation constant of dibasic acid (Malonic acid).

3. To determine hydrolysis constant of aniline hydrochloride.

Reference Books:

1. Findlay's Practical Physical Chemistry (Longman)

2. Advanced Practical Physical Chemistry by J. B. Yadav, Goel publishing house.

3. Practical Physical Chemistry by B. D. Khosla, V. C. Garg (R. Chand and Co.)

4. Systematic experimental Physical Chemistry by Rajbhoj, Chandekar (Anjali Publicaiton) Aurangabad.

5. Practical Physical Chemistry: Nandkumari, Kothari and Lavande.

6. Practical Physical Chemistry by Gurtu (S. Chand).

7. Text Book of Qualitative Inorganic Analysis by A. I. Vogel (ELBS Longman).

Nature of Practical Examination

1) The practical examination will be of **200** marks.

2) The duration of practical examination will be of **three days - six and half hour per day.**

3) Questions related to the practical exercise/project report/industrial visit carried out by the student should be asked in viva.

4) Use of scientific calculator is allowed.

5) S.I. units should be used wherever possible.

6) Use of Chart / Hand book / Text book of practical is allowed.

7) A student is expected to submit a journal certified by the Head of the Department.

8) A student not be permitted to appear at the practical examination unless he/she produces a certified journal. If the journal is lost, the student should produce a certificate from the Head   of   the Department stating that he/she has satisfactory completed the practical work but his /   her   journal is lost.

9) Use of Digital / Analytical / Chainometric / Single pan balance is allowed.

10) A student should submit one copy of project at the time of examination. Each examiner should asses the project work for Five marks and sign the same. If any student will not submit project work, he/she will be given Zero mark for the project.

11) The distribution of marks for practical examination will be as follows:

A) Physical Chemistry 60 marks

    i) Non-instrumental experiment 25 marks

    ii) Instrumental experiment 25 marks

    iii) Viva 05 marks

    iv) Journal 05 marks

B) Inorganic Chemistry 65 marks

    i) Gravimetric analysis 25 marks

    ii) Preparation 15 marks

    iii) Volumetric estimation 15 marks

    iv) Viva 05 marks

    v) Journal 05 marks

C) Organic Chemistry 60 marks

i) Mixture separation and identification of compounds 25 marks

ii) Estimation/Preparation 20 marks

iii) Derivative 05 marks

iv) Viva 05 marks

v) Journal 05 marks

D) Project 15 marks

Total:- 200 marks

SHIVAJI UNIVERSITY, KOLHAPUR

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Accredited By NAAC with 'A' Grade

CHOICE BASED CREDIT SYSTEM

Syllabus For

B.Sc. Part -III Mathematics

SEMESTER V AND VI

(Syllabus to be implemented from June, 2020 onwards.)

B.Sc.Part-III [Semester V] (Credit - 8]

Course code	Title o the course	Instructions Lectures /Week	Duration of term end exam	Marks of Term end exam	Marks (Internal) Of Continuous Assessment	Credit
DSE E9	Mathematical Analysis	3	2 hours	40	10	2
DSE E10	Abstract Algebra	3	2 hours	40	10	2
DSE E11	Optimization Techniques	3	2 hours	40	10	2
DSE E12	Integral Transforms	3	2 hours	40	10	2

B.Sc.Part-III [Semester VI] (Credit - 8]

Course code	Title o the course	Instructions Lectures/Week	Duration of term end exam	Marks Term end exam	Marks (Internal) Of Continuous Assessment	Credit
DSE F9	Metric Spaces	3	2 hours	40	10	2
DSE F10	Linear Algebra	3	2 hours	40	10	2
DSE F11	Complex Analysis	3	2 hours	40	10	2
DSE F12	Discrete Mathematics	3	2 hours	40	10	2

Core Course Practical in Mathematics [CCPM IV to VII]

The practical examination will be conducted at the end of second term that is annual pattern

Total Credit 16

Course code	Title o the course	Instructions Lectures/Week	Duration of term end exam	Marks [End of academic year]	Credit
CCPM IV	Operations Research	5	6 hours	50	4
CCPM V	Laplace and Fourier Transforms	5	6 hours	50	4
CCPM VI	Mathematical Computation Using Python	5	6 hours	50	4
CCPM VII	Project, sturdy tour, viva.	5	6 hours	50	4

EQIVALENCE IN ACCORDANCE WITH TITLES AND CONTENTS OF PAPERS (FOR REVISED SYLLABUS

Sem - V

Old Paper number	Equivalence	New Course code	Title of the course
IX	Real Analysis	DSE E9	Mathematical Analysis
X	Abstract Algebra	DSE E10	Abstract Algebra
XII	Numerical Methods - I	DSE E11	Optimization Techniques
XI	Partial Differential Equations	DSE E12	Integral Transforms

Sem - VI

Old Paper number	Equivalence	New Course code	Title of the course
XIII	Metric spaces	DSE F9	Metric Spaces
XIV	Linear Algebra	DSE F10	Linear Algebra
XV	Complex Analysis	DSE F11	Complex Analysis
XVI	Numerical Methods	DSE F12	Discrete Mathematics

CCPM

Old course code	Equivalence	New Course code	Title of the course
CML – IV	Operations Research Techniques	CCPM IV	Operations Research
CML – V	Numerical Methods	CCPM V	Laplace and Fourier Transforms
CML – VI	Numerical Recipes in C++, SciLab	CCPM VI	Mathematical Computation Using Python
CML – VII	Project, study tour, viva.	CCPM VII	Project, study tour, Seminar, viva.

B.Sc. (Mathematics) (Part-III) (Semester–V & VI)
(Choice Based Credit System)
(Introduced from June 2020)

Course Code: CCPM VII   **Title of Course: Project**, Study- Tour, Viva – Voce

A :PROJECT [30 Marks]

Each student of B.Sc. III is expected to read, collect, understand the culture ofMathematics, its historic development. He is expected to get acquainted withMathematical concepts, innovations, relevance of Mathematics. Report of the projectwork should be submitted through the respective Department of Mathematics.Evaluation of the project report will be done by the external examiners at the time ofannual examination.

B. STUDY TOUR [05 Marks] :

It is expected that the tour should contain at least renown academic institution so that the visiting students will be inspired to go for higher studies in Mathematics.

C. SEMINARS: [05 Marks]

Students should present a seminar before the B.Sc.III class on some topic in Mathematics.

D. VIVA-VOCE (on the project report). [10 Marks]

Nature of Question papers (Theory)

Common nature of question for theory paper mentioned separately:

There will be practical at the end of second term that is annual pattern,

Nature of Practical Question Paper

(1) Core Course Mathematics Practicals - IV

This carries 50 marks.

Examination : 40 Marks

Journal : 10 Marks

(2) Core Course Mathematics Practicals - V

This carries 50 marks.

Examination : 40 Marks

Journal : 10 Marks

(3) Core Course Mathematics Practicals - VI

This carries 50 marks.

Examination : 40 Marks

Journal : 10 Marks

(4) Core Course Mathematics Practicals - VII

This carries 50 marks.

Project : 30 Marks (External Examiner)

Study Tour : 05 Marks (External Examiner)

Seminar : 05 Marks (External Examiner)

Viva Voce : 10 Marks (External Examiner)

Note : Each student of a class will select separate topic for project work. He/ Sheshould submit the reports of his / her project work , Study tour reportto the department and get the same certified.

Teaching Periods :

(i) Total teaching periods for Paper –DSE E-9. E-10,E-11,E-12, F-9,F-10, F-11,F-12 are 12 (Twelve) per week.3 (Three) periods per paper per week.

(ii) Total teaching periods for CCPM-IV, V,VI,VII for the whole class are 20 (Twenty) per week. 5 (Five) periods per Lab. Perweek.

Zoology Paper- X
DSE-F29 (Molecular Cell Biology and Animal Biotechnology)
Theory: 30 hrs. (37.5 lectures of 48 minutes) (Credits 2)

Unit 1: Molecular Biology – 7
1) DNA Replication (Semiconservative mode)
2) DNA Damage and Repair mechanism
3) Regulation of gene expression- Operon concept
4) Genetic Code:
      i) Properties of Genetic code
      ii) Codon assignment
      iii) Wobble hypothesis

Unit 2: Protein synthesis 8
A) Transcription
i) Process in prokaryotes and eukaryotes
ii) RNA polymerase
iii) Post transcriptional modification in RNA
B) Translation in prokaryotes and eukaryotes
i) Initiation
ii) Elongation
iii) Termination

Unit 3 : Molecular Techniques in Gene manipulation 15
1. Restriction enzymes: Nomenclature, detailed study of Type II.
2. Characteristics of Cloning vectors: Plasmids, Cosmids, Phagemids, Lambda Bacteriophages
3. Gene cloning: Transformation techniques by Calcium chloride method and electroporation
4. Construction of genomic and cDNA libraries
5. Southern, Northern and Western blotting
6. DNA sequencing: Sanger method
7. Polymerase Chain Reaction,
8. DNA Finger Printing
9. DNA micro array

SUGGESTED READINGS:

1. Brown, T.A. (1998). Molecular Biology Labfax II: Gene Cloning and DNA Analysis. II Edition, Academic Press, California, USA. Glick, B.R. and Pasternak, J.J. (2009).
2. Molecular Biotechnology - Principles and Applications of Recombinant DNA. IV Edition, ASM press, Washington, USA. Griffiths, A.J.F., J.H. Miller, Suzuki, D.T., Lewontin, R.C. and Gelbart, W.M. (2009).
3. An Introduction to Genetic Analysis. IX Edition. Freeman and Co., N.Y., USA. Snustad, D.P. and Simmons, M.J. (2009).
4. Principles of Genetics. V Edition, John Wiley and Sons Inc. Watson, J.D., Myers, R.M., Caudy, A. and Witkowski, J.K. (2007).
5. Recombinant DNAGenes and Genomes- A Short Course. III Edition, Freeman and Co., N.Y., USA. Beauchamp, T.I. and Childress, J.F. (2008).
6. Principles of Biomedical Ethics. VI Edition, Oxford University Press.
7. Cell and Molecular Biology, 8th Edition, De. Robertis EDP and De Robertis Jr. EMF, Lippincott Williams and Wilkins,Philadelphia.
8. Cell Biology, C.B. Powar, Himalaya Publication House.
9. Cell and Molecular Biology, EJ. Dupraw, Academic Press, NewYork.
10. Cell Structure and Function - A. G. Loewy, P. Siekevitz, J. R. Meninger & J. A. N. Gallant, Saunder College, Philadelphia.
11. Molecular Biology of the Cell - 3rd Edition, Bruce Alberts, Dennis Bray, Julian Lewis, Martin Raff, K. Roberts & James D. Watson, Garian Publishing, New York.

Zoology Paper- XI

DSE-F30 (Biotechniques and Biostatistics)

Theory: 30 hrs. (37.5 lectures of 48 minutes) (Credits 2)

Unit I: Genetically Modified Organisms   9

1. Production of cloned and transgenic animals:
    a. Nuclear Transplantation
    b. Retroviral Method
    c. DNA microinjection
2. Applications of transgenic animals:
    a. Productions of pharmaceuticals
    b. Production of donor organs
3. Knockout mice.

Unit II: Culture Techniques and Applications   6

    a. Animal cell culture: Introduction, principle and applications
    b. Stem Cells: Introduction to stem cells
        i) Potency of stem cells: Totipotency, Pleurepotency, Multipotency,
        Unipotency
        ii) Sources of stem cells-Embryo, Fetal, Adult, Bone marrow

Unit III: Biostatistics   15

    a. Classification of Biological data
    b. Frequency distribution
    c. Tabulation
    d. Graphical representation of data
    e. Measures of central tendency (Mean, Median, Mode)
    f. Dispersion – Mean, deviation & standard deviation
    g. Correlation – Scattered diagram, Karl Pearson's correlation coefficient and
        Spearman's rank correlation coefficient.

SUGGESTED READINGS:

1. Brown, T.A. (1998). Molecular Biology Labfax II: Gene Cloning and DNA Analysis. I
    Edition, Academic Press, California, USA. Glick, B.R. and Pasternak, J.J. (2009).
    Molecular Biotechnology - Principles and

2. Applications of Recombinant DNA. IV Edition, ASM press, Washington, USA. Griffiths, A.J.F., J.H. Miller, Suzuki, D.T., Lewontin, R.C. and Gelbart, W.M. (2009)

3. An Introduction to Genetic Analysis. IX Edition. Freeman and Co., N.Y., USA. Snustad, D.P. and Simmons, M.J. (2009).

4. Principles of Genetics. V Edition, John Wileyand Sons Inc. Watson, J.D., Myers, R.M., Caudy, A. and Witkowski, J.K. (2007).

5. Recombinant DNAGenes and Genomes- A Short Course. III Edition, Freeman and Co., N.Y., USA.Beauchamp, T.I. and Childress, J.F. (2008).

6. Principles of Biomedical Ethics. VI Edition Oxford University Press.

7. Elements of Biotechnology - P. K. Gupta, Rastogi Publications.

8. Gene V & VI, 1994, Lewin B., Oxford University Press, Oxford.

9. Concept of Genes-Pearson Edition 9.Cell and Molecular Biology

SHIVAJI UNIVERSITY, KOLHAPUR
Syllabus of B.Sc. Part III Zoology
Zoology Practical – III (Credits-02)

Molecular biology, Animal biotechnology, Biostatistics & Biotechniques

I] Microtechnique

1. Preparation of permanent histological slides by HE technique
2. Histochemical technique
   a. AB PH 1 technique
   b. AB PH 2.5 technique
   c. PAS technique

II] Biotechniques

1. Chromatography – Separation of amino acid by paper chromatography
2. DNA isolation
3. Demonstration of DNA by feulgan technique
4. To study the following technique (photographs)
   a) Southern blotting
   b) Northern blotting
   c) Western blotting
   d) DNA sequencing (Sangers method)
   e) PCR
   f) DNA fingerprinting

III) Biostatistics

   Any 10 example based on theory

IV] Project (any suitable work possible in local area or from the syllabus) Report of
   the same to be submitted at the time of practical examination

SHIVAJI UNIVERSITY, KOLHAPUR.

Accredited By NAAC with 'A' Grade

Revised Syllabus For

B.Sc Part- III

Physics

Syllabus to be implemented from

June, 2020 onwards.

B.Sc. Part-III Physics CBCS Syllabus with effect from June 2020

B.Sc. Part-III Semester-V

PHYSICS Paper-IX

DSE-E1 Mathematical Physics

Theory: 36 Hours (45 Lectures of 48 minutes)

Marks -50 (Credits: 02)

UNIT-I

1. **Partial Differential Equation**   **(8 hours)**

   Introduction to differentialequations, Method of separation of variables for solving second order partial differential equations, Form of two dimensional Laplace differential equation in Cartesian coordinates and its solution, Three dimensional partial differential equation in Cartesian coordinates and its solution, The differential equation of progressive wave and its solution.

2. **Frobenious Method and Special Functions**   **(10hours)**

   Singular points of second order differential equations, Application of singularity to Legendre and Bessel differential equation, Series solution method of solving second order linear differential equation(Frobenious method) and its application to Legendre differential equation.

UNIT-II

1. **Some Special Integrals**   **(6 hours)**

   Gamma function, Properties of Gamma function, Beta function, Properties of Beta function,Relation between Beta and Gamma functions, Error function (Probability Integral).

2. **Complex Analysis**   **(12 hours)**

   Revision of complex numbers and their graphical representation: Geometrical representation, Equal complex numbers, Addition, Subtraction, Multiplication and Division of complex number by geometry. Types of complex numbers, square roots of complex numbers, Logarithmic function of complex variables, Euler's formula, De'Moivre's theorem, Cauchy-Riemann conditions.

Reference Books

1. Advanced calculus, Robert C. Wrede, Murray Spiegel.
2. Differential Equations with Modeling Applications, Dennis G.Zill.
3. Partial Differential Equations,Gupta Malik and Mittal.
4. Differential Equations,Gupta Malik and Mittal.
5. Differential Equations,RamachandraRao,H. R. Anuradha.
6. Partial Differential Equations, N. P. Bali.
7. Differential Equations, N. Ch. S. N. Iyenger.
8. Mathematical Physics, B. S. Rajput.
9. Mathematical Methods for Physicists, Arfken, Weber, 2005, Elsevier.
10. Mathematical Methods for Scientists and Engineers, McQuarrie, 2003, Viva Books.
11. Mathematical Physics, H. K. Das, Rama Varma.
12. Essential Mathematical methods, K. F. Riley, M. P. Habson, 2011,Cambridge.
13. Mathematics for Physicists, Susan M.Lea, 2004, Thomson Books/Cole.

B.Sc. Part-III Semester-V
PHYSICS Paper-X
DSE-E2 Quantum Mechanics
Theory: 36 Hours (45 Lectures of 48 minutes)
Marks -50 (Credits: 02)

Unit-I

1. Matter Waves (08 hours)

Wave particle duality, De-Broglie hypothesis of matter waves, Derivation of wavelength of matter wave, Concept of wave packet, Relation between group velocity - phase velocity and group velocity-particle velocity, Davisson and Germer experiment, Uncertainty principle (statements only): position–momentum and energy- time, Application of uncertainty principle- non existence of free electrons in the nucleus.

2. Schrodinger's Wave Equation (10 hours)

Wave function and its physical interpretation, Condition of physically acceptable wave function, Normalized and orthogonal wave function, Schrödinger time dependent and time independent (steady state) wave equations in 1D and 3D, Probability current density(continuity equation), Eigen values and Eigen functions, Expectation values of dynamic variables.

Unit-II

1. Operators in Quantum Mechanics (08 hours)

Definition of an operator, Position operator (x), Linear momentum operator (p), Commutation relation in quantum mechanics, Commutation relation between x and p, Kinetic energy operator (T), Hamiltonian operator (H), Parity operator (π), Angular momentum operator (L) – components of angular momentum operator in Cartesian coordinate system, Ladder operators, Eigen values of L_z and L^2 (use equations for L^2 and Lz in spherical polar coordinates).

2. Applications of Schrodinger Equation (10 hours)

Particle in a rigid box (infinite potential well) in one dimension and three dimension, Step potential- reflection and transmission coefficients, Potential barrier- tunneling effect (qualitative treatment), One dimensional simple harmonic oscillator (operator method)- energy levels, zero point energy, Schrodinger equation for Hydrogen atom in spherical polar coordinates, Separation of radial and angular parts, Solution of radial part of Schrodinger's equation - Energy Eigen values.

Reference Books

1. Modern Physics, R. Murugeshan, 1997, S. Chand and Company Ltd.

2. Atomic Physics, J B Rajam, S Chand and Co.

3. Perspectives of Modern Physics, Arthur Beiser, McGraw Hill International Editions.

4. Concepts of Modern Physics, Arthur Beiser, Ahobhit Mahajan, S. Rai Choudhury, Sixth Edition, Tata McGraw Hill Education Private Ltd.

5. Modern Physics, S. L. Kakani and Shubhra Kulkarni, 2006, Viva books Private Ltd.

6. Modern Physics, D. L. Sehgal, K. L. Chopra and N. K. Sehgal, Reprint 1995, Sultan Chand & sons.

7. Introduction to Modern Physics, F. K. Richtmyer, E. H. Kennard, John N. Cooper, Sixth Edition, Tata McGraw Hill Education Private Ltd

8. A Text book of Quantum Mechanics, P.M. Mathews & K. Venkatesan, 2nd Edn.,2010, Tata McGraw Hill,

9. Quantum Mechanics, Leonard I. Schiff, 3rdEdn. 2010, Tata McGraw Hill.

10. Quantum Mechanics Theory and Applications, A. K. Ghatak and S. Lokanathan, Third Edn.1995, Macmillan India Ltd.

11. Quantum Mechanics Theory and applications, AjoyGhatak, S. Lokanathan, 5th Ed,2017, Trinity.

12. Quantum Mechanics, Chatwal and Anand, Reprint 2010, Himalaya Publishing house.

13. Quantum Mechanics, Gupta, Kumar, Sharma, Thirtieth Edn., 2011, Jai Prakash Nath Publications.

14. Advanced Quantum Mechanics, SatyaPrakash, Reprint 2011, KedarNath Ram Nath Meerut.

15. Advanced Quantum Mechanics, B. S. Rajput, Ninth Edn., 2009, Pragati Prakashan.

16. Quantum Mechanics, B. N. Srivastava, Reprint 2011, Pragati Prakashan.

17. Quantum Mechanics, P. J. E. Peebles, 2003, Prentice Hall of India.

18. Quantum Mechanics, S. P. Singh,M. K. Bagade, Kamal Singh, S. Chand & company Ltd, New Delhi

UNIT-I

1.Lagrangian Formulation (10 hour)

Constraints, Degrees of freedom, Generalized coordinates, Principle of virtual work, D'Alembert's principle, Lagrange's equation from D'Alembert's principle, Applications of Lagrange's equation to a particle in space, Atwood's machine and a bead sliding on uniformly rotating wire under force free condition.

2.Techniques of Calculus of Variation (8 hour)

Hamilton's principle, Deduction of Hamilton's principle from D'Alembert's principle, Deduction of Lagrange's equation from Hamilton's principle, Applications-shortest distance between two points in a plane,Brachistochrone problem.

UNIT- II

1.Special Theory of Relativity (12 hours)

Inertial and non-inertial reference frames, Galilean transformation equations, Michelson-Morley experiment, postulates of special theory of relativity, Lorentz transformation equations, Relativistic addition of velocities, Length contraction, Time dilation, Variation of mass with velocity, Mass-energy relation.

2. Charged Particles Dynamics (6 hours)

Poisson's and Laplace's equations and their physical significance, Laplace's equation in one dimension and its solutions, Motion of charged particle - in uniform electric field E, magnetic field B, Crossed uniform electric field E and magnetic field B.

Reference Books

1. Classical Mechanics, Goldstein Herbert, NarosaPubli./ Pearson Edu. 2018
2. Classical Mechanics, Gupta, Kumar and Sharma, Pragati Praka.2012
3. Introduction to Classical Mechanics, Nikhil Ranjan Roy, S Chand Publ. 2016
4. Introduction to Classical Mechanics,Takwale R.G., Puranik P. S.,Tata McGraw 1979
5. Classical Mechanics,Panat P.V., NarosaPubli. 2016
6. Atomic physics, J B Rajam S Chand
7. Concepts of Modern Physics, ArthurBeiser, McGraw Hill
8. Introduction to Special Relativity, Robert Resnick, Wiley India
9. Classical Electrodynamics, PuriS.P., Tata McGraw/Alpha Science 2011
10. Classical Electrodynamics, Jackson J. D., Wiley India , 2007
11. Electromagnetics, Laud B.B., New Age Interna. 2011

B.Sc. Part III-Semester-V
PHYSICS Paper-XII
DSE-E4 Digital and Analog Circuits and Instrumentation
Theory: 36 Hours (45 Lectures of 48 minutes)
Marks -50 (Credits: 02)

Unit-I

1.Digital Electronics (08 hours)

Review of basic logic gates, Derived logic gates (NOR, NAND, XOR and XNOR gates), NAND and NOR gates as universal gates, De Morgan's theorems, R-S flip flop, J-K flip-flop, Half adder, Full adder, 4 bit parallel binary adder.

2.TransistorsAmplifier and Sinusoidal Oscillators (10 hours)

Transistor Amplifier: Single stage transistor CE amplifier, D.C. and A.C. equivalent circuits, load line analysis-d.c. load line, a.c. load line and Q point.

Oscillator: Feedback in amplifiers and its types,theory of feedback oscillator, Barkhausen's criterion for sustained oscillations,Oscillatory circuit (tank circuit),essentials of transistor oscillator, sinusoidal oscillators-phase shift oscillator, Colpitts oscillator, Hartley oscillator, Crystal oscillator using transistors.

Unit-II

1. **Cathode Ray Oscilloscope** (8 hours)

Introduction to CRO, Block diagram of CRO, Principle, Construction and working of CRT, Applications of CRO: measurement of A.C. and D. C. voltages, periodic time, frequency and phase difference, Lissajous figures.

2. **Operational Amplifier and Timer** (10 hours)

Operational Amplifier: Differential amplifier and its type, Op-Amp, Block diagram of an Op- Amp. Op-Ampparameters, Characteristics of an ideal and practical Op-Amp (IC 741), Applications of Op-Amps: Inverting amplifier and Non-inverting amplifier, Adder, Subtractor, Differentiator, Integrator.

Timer IC: Block diagram of IC555, IC 555 Pin configuration, Applications of IC 555 as astable and monostablemultivibrator.

ReferenceBooks

1. Integrated Electronics, J. Millman and C.C. Halkias, 1991, Tata Mc-Graw Hill.
2. Electronic devices and circuits, S. Salivahanan and N. Suresh Kumar, 2012, Tata Mc-Graw Hill.
3. Microelectronic Circuits, M.H. Rashid, 2^{nd}Edn.,2011, Cengage Learning.
4. Modern Electronic Instrumentation & Measurement Tech., Helfrick&Cooper,1990, PHI Learning
5. Digital Principles & Applications, A.P. Malvino, D.P. Leach &Saha, 7^{th}Ed.,2011, Tata McGraw Hill
6. Microelectronic circuits, A.S. Sedra, K.C. Smith, A.N. Chandorkar, 2014, 6^{th}Edn., Oxford University Press.
7. Fundamentals of Digital Circuits, A. Anand Kumar, 2^{nd}Edition, 2009, PHI Learning Pvt. Ltd.
8. OP-AMP and Linear Digital Circuits, R.A. Gayakwad, 2000, PHI Learning Pvt. Ltd.
9. Basic Electronics: A text lab manual, P.B. Zbar, A.P. Malvino, M.A. Miller, 1994, Mc-Graw Hill.
10. Electronics: Fundamentals and Applications, J.D. Ryder, 2004, Prentice Hall.
11. Electronic Principle, Albert Malvino, 2008, Tata Mc-Graw Hill.
12. A text book of Electronics, SantanuChattopadhay, New Central Book Agency, Kolkata
13. Basic Electronics, 2^{nd}Edition , B. Basavaraj, H. N. Shivashankar, Vikas Publishing house pvt. Ltd. New Delhi.
14. Electronic principles, V. K. Mehta
15. Basic Electronics, Bhargava and Gupta

B.Sc. Part-III Semester-VI

PHYSICS Paper-XIII

DSE-F1 Nuclear and Particle Physics

Theory: 36 Hours (45 Lectures of 48 minutes)

Marks -50 (Credits: 02)

Unit-I

1. General Properties of Nuclei and Nuclear Model   **(10 hours)**

Constituents of nucleus and their intrinsic properties, Quantitative facts about size, mass, chargedensity (matter energy), binding energy, average binding energy and its variation with mass number,Liquid drop model approach, Semi empirical mass formula, Magic numbers.

2. Particle Accelerators   **(8 hours)**

Need of accelerators,Cyclotron- construction, working, theory and its limitations,Principle of phase stable orbit, Synchrocyclotron - construction and working, Synchrotrons- electron synchrotron and proton synchrotron, Betatron - principle, construction and workingcondition, expression of energy gain.

Unit-II

1. Nuclear Detectors   **(10 hours)**

Ionization chamber, Geiger Muller counter- construction, working and theory, dead time and recoverytime, quenching mechanism, Construction of photo-multiplier tube (PMT), Scintillation detector-principle, construction and working, Wilson cloud chamber, Semiconductor detector, Cerenkovradiations, Cerenkov detector.

2. Particle Physics   **(8 hours)**

Particle interactions, Classification of elementary particles, Symmetries and conservation laws- energy,momentum, angular momentum and parity, Baryon number, Lepton number, Concept of quark model.

ReferenceBooks

1. Introductory nuclear Physics, Kenneth S. Krane (Wiley India Pvt. Ltd., 2008).

2. Concepts of nuclear physics, Bernard L. Cohen. (Tata Mcgraw Hill, 1998).

3. Introduction to the physics of nuclei & particles, R.A. Dunlap. (Thomson Asia, 2004)

4. Introduction to Elementary Particles, D. Griffith, John Wiley & Sons

5. Quarks and Leptons, F. Halzen and A.D. Martin, Wiley India, New Delhi

6. Basic ideas and concepts in Nuclear Physics - An Introductory Approach by K. Heyde (IOP-Institute of Physics Publishing, 2004).

7. Radiation detection and measurement, G.F. Knoll (John Wiley & Sons, 2000).

8. Theoretical Nuclear Physics, J.M. Blatt &V.F.Weisskopf (Dover Pub.Inc., 1991)

9. Nuclear Physics by John Lilley,The Manchester Physics Series – Willy

10. Nuclear Physics by S. B. Patel, New age international (p) lit. Publishers New Delhi.

11. Modern Physics by R. Murugeshan, S. Chand & company Ltd, Ram Nagar New Delhi

12. Nuclear Physics by D. C. Tayal, Himalaya Publishing house

13. Concept of modern physics by ArthirBeiser, Tata McGraw- Hill publishing company ltd. New Delhi

14. Atomic and nuclear structure by D. K. JHA, Discovery publishing house New Delhi

15. Nuclear energy by D. K. JHA Discovery publishing house New Delhi)

16. Nuclear physics by S. N. Ghoshal , S. Chand & company Ltd, Ram Nagar New Delhi

Unit-I

1. Crystal Structure   (10 hours)

Solids: amorphous, polycrystalline and crystalline materials; lattice, basis, unit cell- primitive, non-primitive unit cell, symmetry operations, symmetry elements of cube, Bravais lattice in two and three dimensions, Miller indices, Miller indices andinter-planer spacing, Simple crystal structures: SC, BCC, FCC and HCP(Co-ordination number, atomic radius, atoms per unit cell and packing fraction)

2. X-Ray Diffraction   (08 hours)

Reciprocal lattice and its properties, Brillouin zone, Diffraction of X-rays by crystals, Ewald construction, Bragg's law in reciprocal lattice, Experimental methods in X-ray diffraction (Laue method,rotating crystal method,powder photograph method),Analysis of cubic crystal by powder method.

Unit-II

1. Magnetic Properties of Matter   (10 hours)

Classical Langevin theory of diamagnetic and paramagnetic materials, Quantum mechanical treatment of paramagnetism, Curie's law, Weiss theory of ferromagnetism and ferromagnetic domains, Explanation of B-H curve, Hysteresis and energy loss.

2. Elementary Band Theory of Solids   (8 hours)

Concept of density of states, Bloch theorem (statement only), Kroning–Penny model, Origin of energy gap, Velocity of electrons according to band theory, Effective mass of an electron, Distinction between metals, semiconductors and insulators, Hall Effect - Hall voltage and Hall Coefficient.

Reference Books

1. Introduction to Solid State Physics, Charles Kittle, 8th Ed.,2004,Wiley India Pvt. Ltd.
2. Elements of Solid State Physics, J.P. Srivastava, 2nd Ed., 2006,Prenice-Hall of India
3. Introduction to Solid, Leonid V.Azaroff,2004,Tata Mc-Graw Hill
4. Solid State Physics, Neil W. Aschroft and N. David Mermin, 1976, Cengage Learning
5. Solid State Physics,Rita John,2014,Mc-Graw Hill
6. Solid State Physics, Adrianus J. Dekker, Macmillan Publishers India Ltd.
7. Solid State Physics, M.A.Wahab,3rd Ed.,2018,Narosa Publishing House Pvt. Ltd.
8. Solid State Physics, S.O.Pillai,5th Ed., New Age International(P) Ltd., Publishers.
9. Fundamentals of Solid State Physics, Saxena-Gupta-Saxena, (PragatiPrakashan Meerut)
10. Solid State Physics, R. L. Singhal
11. Solid State Physics, C.M. Kachhava (Tata McGraw Hill Publication)
12. Elements of X-ray diffraction, B.D.Cullity and S.Stock
13. Solid state electronic devices, B.G.Streetman& S.K.Banerjee,5thEd.[PHI Learning Delhi.

B.Sc. Part-III Semester-VI
PHYSICS Paper-XV
DSE-F3 Atomic and Molecular Physics and Astrophysics
Theory: 36 Hours (45 Lectures of 48 minutes)
Marks -50 (Credits: 02)

UNIT-I

1. Atomic Spectra (09 hours)

Observed hydrogen fine structure, Spectral notations and optical spectral series for doublet structure, Spectrum of sodium and its doublet fine structure, Selection and intensity rules for fine structure doublets, Normal order of fine structure doublets, Electron spin-orbit interaction,Normal and anomalous Zeeman effect and their explanation from vector atom model, Lande's g factor.

2. Molecular Spectra (09 hours)

Molecular bond, Electron sharing, H_2^+ molecular ion, The hydrogen molecule, Rotational energy levels, Rotational spectra, Vibrational energy levels, Vibrational spectra, Vibration – rotation spectra, Electronic spectra of diatomic molecules.

UNIT-II

1 Raman Spectra (4 hours)

Raman Effect,Characteristic properties of Raman lines, Classical and quantum theory of Raman Effect,Difference between Raman spectra and infrared spectra.

2. Structure of Universe: (08 hours)

Big-Bang theory, Steady state theory, Oscillating theory,Hubble law, Cosmological tests, Milky Way galaxy, Origin of solar system - Condensation theory; arguments for and against the theory.

3. Stellar Evolution (06 hours)

The H–R Diagram,Evolution of main sequence stars - Red giants and White dwarfs, Evolution of more massive stars- Supernova, Neutron star, Black hole,Surface of the Sun, Sunspots, Sunspot cycle.

Reference books

1. Atomic and Nuclear Physics – H. Semat and T. E. Albright.

2. Introduction to Atomic Spectra – H. E. White.

3. Concepts of Modern Physics – Arthur Beiser.

4. Perspectives of Modern Physics – Arthur Beiser.

5. Spectroscopy (Atomic and Molecular) – Gurdeep Chatwal, Sham Anand.

6. Astronomy – Fundamentals and Frontiers – Robert Jastrow and M. H.Thompson

7. Astronomy – Frank Bash.

8. Foundation of Astronomy, Michael A. Seeds,10th edition, Thomson Learning, Inc., USA, 2008.

B.Sc. Part-III Semester-VI
PHYSICS Paper-XVI
DSE-F4 Energy Studies and Materials Science
Theory: 36 Hours (45 lectures)
Marks 50 (Credits: 02)

UNIT-I

1. Energy and Wind Energy   (8 hrs)

Energy, Forms of energy, Man and environment, Energy chains, Classification of energy resources, Energy demands, Age of renewable and alternatives, Wind energy, Wind energy chains, Wind energy quantum, Planning of wind farm, Wind power density, Efficiency factor of wind turbine (P-H graph), Power of wind turbine for a given incoming wind velocity, Types of a wind turbine generator unit, Horizontal axis propeller type wind turbine generator unit.

2. Solar Energy   (8 hrs)

Solar energy, Solar energy spectrum (UV,Visible and IR), Utilization of solar energy-thermal route, photovoltaic route, Essential subsystems in solar energy plant, Solar constant, Clarity index, Solar insolation, Solar energy from satellite station through microwave to earth station, Solar photovoltaic systems, Merits and limitations of solar PV systems, Prospects of solar PV systems, Power of a solar cell and solar PV panel.

3. Biomass Energy   (2 hrs)

Origin of biomass, Biomass energy resources (biomass from cultivated crops, biomass from waste organic matter), Biomass conversion process (biochemical conversion-anaerobic digestion and fermentation)

UNIT-II

1. Superconductivity   (6 hrs)

Idea of superconductivity, Critical temperature, Critical magnetic field, Meissner effect, Type-I and Type-II superconductors, London equation and penetration depth, Isotope effect, Application (magnetic levitation)

2. Nanotechnology   (12 hrs)

Introduction tonanoscience and nanotechnology, Length scales relevant to nanoscience, Nanostructures: 1D, 2D and 3Dnanostructures, Size effects in nanosystems, Quantum

confinement, Synthesis of nanostructured materials(Top down and bottom up approach), Photolithography, Ball milling,Nucleation and growth, Applications of nanotechnology (Spintronics, Molecular electronics, Nanobiotechnology)

ReferenceBooks

1. Energy Technology – Non-conventional, Renewable and Conventional – S. Rao and Dr. Parulekar.

2. Non-conventional Energy sources - G. D. Rai (4th edition), Khanna Publishers, Delhi.

3. Solar Energy - S.P. Sukhatme (second edition), Tata Mc.Graw Hill Ltd, New Delhi.

4. Solar Energy Utilization - G. D. Rai (5th edition), Khanna Publishers, Delhi.

5. Non-conventional Energy Sources – G. D. Rai (Khanna Publishers).

6. Elements of Material Science and Engineering - I.H.Vanvlach (4th Edition)

7. Material Science and Engineering - V. Raghva

8. Material science and metallurgy for Engg.-Kodigire V. D. Everest publication house, Pune

9. Material Science and Engg. - 5th Edition- V. Raghavan PHI Learning Pvt. Ltd. Delhi

10. Nanotechnology: Principles and Practices,Sulbha K Kulkarni (2nd Edition), Capital Publishing Co. New Delhi.

11. Science at the Nanoscale: An Introductory Textbook, Chin Wee Shong, ChorngHaur Sow, Andrew T. S. Wee (Pan Stanford Publishing Pte. Ltd.)

12. Introduction to Nanoscience, S.M. Lindsay (Oxford University press)

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B.Sc.Part III Physics Laboratory Experiments

Total Marks: 200 Credits: 08

- **Group-I**

1. Resonance pendulum
2. S.T. of soap solution
3. Surface tension of mercury by Fergusson modified method
4. Y and η using Flat Spiral Spring
5. Y by Koenig's method
6. Y by Cornu's spiral
7. C program to arrange the given set of numbers in ascending/descending order
8. C program to findlargest/smallest number from a given set of numbers
9. Scilab Expt. 1 (problem from Quantum Mechanics)
10. Scilab Expt. 2 (problem from Quantum Mechanics)

- **Group-II**

1. Cardinal points by turn table method
2. Cardinal points by Newton's method
3. Refractive index of glass by Brewster's law
4. Diffraction at a Single Slit
5. Diffraction at cylindrical obstacle
6. Lloyd's single mirror
7. Double refracting prism
8. Diameter of Lycopodium powder
9. Spherical aberration
10. Absorption spectrum of a liquid ($KMnO_4$ solution)

- **Group-III**

1. Self Inductance by Owen's Bridge
2. Measurement of B_H , B_V and θ using Earth Inductor /Hysteresis by magnetometer method
3. Mutual inductance using Ballistic galvanometer.
4. Resistance of B.G. by half deflection method
5. e/m of Electron By Thomson's Method/Calibration of wire by Carey Foster bridge
6. Calibration of wire by Griffith's method

7. Absolute capacity of condenser

8. I-V characteristics of Solar Cell

9. Band gap energy of semiconductor using p-n junction diode

10. Determination of Plank's constant by using LED

- **Group–IV**

1. To verify the truth tables of NAND, NOR, Ex-OR and Ex-NOR gates by usingbasic gates with IC-74 series.

2. To verify the De-Morgan's theorems by using IC-74 series.

3. To design a single stage CE amplifier of given gain using voltage divider bias.

4. To built and test Colpitts oscillator using BJT.

5. To builtand test phase shift oscillator using BJT.

6. To determine A.C. and D.C. sensitivity of the C.R.O. andto measure unknown frequency.

7. To design and test an astablemultivibrator using IC-555 Timer.

8. To design and testmonostablemultivibratorusing IC-555 Timer.

9. To studyOp-amp as an inverting amplifier.

10. To study Op-amp as Schmitt trigger.

Skill Testing Experiments

- **Group-V-A**

   1. Study of divergence of LASER beam

   2. Measurement of wavelength of LASER using plane diffraction grating

   3. Schuster's method and optical leveling of spectrometer

   4. Obtaining Biprism fringes without lateral shift

   5. Measurement of distance between two coherent sources in Biprism experiment

   6. Polar graph using photocell/photovoltaic cell

   7. Study of quantum tunneling effect using tunnel diode

   8. Testing of electronic components

   9. C program – Edit,save and execute given C program

   10. C program – Edit,save and execute given C program

- **Group – V-B**
    1. Radius of Capillary bore using mercury thread
    2. Determination of lattices constant using given XRD powder pattern
    3. Estimation of errors
    4. Measurement of phase shift of RC network using CRO
    5. Study of Half and Full adder
    6. Simplifation of digital circuit using Boolean laws (paper-work).
    7. Measurement of resistance of galvanometer (Kelvin's method)
    8. Electrical wiring of bulb, switch and plug.
    9. Tracing of given electronic circuit/ build the given circuit using breadboard
    10. Assembling of given electronic circuit(soldering method)

- **Group VI: Assessment of Annual Work of a Student**
    1. Certified Laboratory Journal.
    2. Study Tour Report.
    3. Seminar Report (2 Seminars) / Project work.

- **Reference Books for practical**
1. Advanced Practical Physics for students, B.L. Flint & H.T. Worsnop, 1971, Asia Publishing House.
2. Advanced level Physics Practical, Michael Nelson and Jon M. Ogborn, 4th Edition, reprinted 1985, Heinemann Educational Publishers
3. A Text Book of Practical Physics, Indu Prakash and Ramakrishna, 11th Edition,2011, Kitab Mahal, New Delhi.
4. B.Sc. Practical Physics, C.L.Arora, S.Chand & Company Pvt.Ltd., New Delhi
5. B.Sc. Practical Physics, Harman Singh,Hemane, 2012 Edition.

- **Revised Scheme of Practical Examination for B. Sc. Part – III**
1. Practical examination will be conducted annually.
2. Practical examination will be conducted for three days per batch.
3. The examination will be conducted in two sessions per day and each session will be of three hours duration.

4. Every candidate should perform one experiment each from Groups I to IV and one experiment each from Group V-A and Group V-B (total 6 experiments).

5. Study tour anywhere in India is compulsory.

6. At least eighty percent practical should be completed by the student.

7. The marks distribution for practical is as below.

Practical groups	Marks
Group I	30
Group II	30
Group III	30
Group IV	30
Group VA-15, Group VB-15	30
Group VI I)Certified laboratory journal (certified Journal- 10 marks, neatness-5 marks, punctuality- 5 marks)	20
II) Study Tour Report	10
III) Seminar Report / Project Report	20
Total Marks	**200**

Nature of Question Paper

Theory: Time -2 hours, Marks-50

Question 1: Select the correct alternative (Compulsory 10 questions) 10 marks

(Four alternatives for each question)

Question 2: (Attempt any Two out of three) 20 marks

(Long answer type)

Question 3: (Attempt any four out of six) 20 marks

(Short answer type)

- **Note:** Equal weightage should be given to each unit.

SHIVAJI UNIVERSITY, KOLHAPUR.

" A" Re-accredited By NAAC

(2014) with CGPA-3.16

NEW SYLLABUS FOR

B.Sc. Part III
BIOCHEMISTRY

CBCS PATTERN

SYLLBUS TO BE IMPLEMENTED FROM JUNE 2020-2021

REVISED SYLLABUS FOR BACHELOR OF SCIENCE PART - III : BIOCHEMISTRY

1. **TITLE** :Biochemistry
2. **YEAROF IMPLEMENTATION** :Revised Syllabus will be implemented from June 2020 onwards.
3. **PREAMBLE**:

   This syllabus is framed to give sound knowledge with understanding of Biochemistry to undergraduate students of three years of B.Sc. degree course. Students learn biochemistry as a separate subject from B.Sc. I. The goal of the syllabus is to make the study of biochemistry popular, interesting and encouraging to the students for higher studies including research. The new and updated syllabus is based on a basic and applied approach with vigor and depth. At the same time precaution is taken to make the syllabus comparable to the syllabi of other universities and the needs of industries and research.

   The syllabus is prepared after discussion at length with number of faculty members of the subject and   experts
   from industries and research fields. The units of the syllabus are well defined, taking into consideration
   the level and capacity of students.

4. **GENERAL OBJECTIVES OF THE COURSE** :

   1) To make the students knowledgeable with respect to the subject and practicable applicability.
   2) To promote understanding of basic and advanced concepts in biochemistry.
   3) To expose the students to various emerging areas of biochemistry.
   4) To prepare students for further studies, helping in their bright career in subject.
   5) To expose the students to different processes used in
      industries and research fields.

   6) To develop their ability to apply the knowledge of Biochemistry
      In day to day life.
   7) To prepare the students to accept the challenges in life sciences.
   8) To develop skills required in various industries, research labs and in the field of human health.

5. **DURATION** : The course shall be a full time course .
6. **PATTERN**: Pattern of Examination will be Semester.
7. **MEDIUM OF INSTRUCTION** :The medium of instruction shall be in English.
8. **STRUCTURE OF COURSE** -

   1) B. Sc. III : Total Number of Papers - 8

Sr.No.	Subjects	Marks
	SEMISTER V	
1.	Course – IX	40+10
2.	Course – X	40+10
3.	Course – XI	40+10
4.	Course – XII	40+10
	SEMISTER VI	
5.	Course – XIII	40+10
6.	Course – XIV	40+10
7.	Course – XV	40+10
8.	Course – XVI	40+10
	PRACTICAL	
1.	Practical Course	200
Total		600

2) **Structure and Titles of Papers of B.Sc. III Course:**

SEMESTER V

Papers
Course - IX   (DSE – E57) -   Molecular Biology
Course - X   (DSE – E58) -   Genetic Engineering
Course - XI   (DSE – E59) -   Biomembrane Transport And Cytoskeleton
Course – XII (DSE – E60) -   Biochemical Techniques and Bioinformatics

SEMESTER VI

Papers
Course - XIII (DSE – F57) - Neurochemistry
Course - XIV (DSE – F58) - Cancer Biology
Course - XV   (DSE – F59) - Clinical Biochemistry and Immunochemistry
Course - XVI (DSE – F60) - Fermentation Technology

9. SCHEME OF TEACHING AND EXAMINATION:

[The scheme of teaching and examination should be given as applicable to the course/paper concerned.]

Sr. No.	Subject/Paper	Teaching Scheme (Hrs/week)		
		L	P	Total
1	Course – IX and XIII	3		
2	Course – X and XIV	3		
3	Course – XI and XV	3		
4	Course – XII and XVI	3		12
5	Practical		20	20
	Total			32

10.   SCHEME OF EXAMINATION:

- The examination shall be conducted at the end of each semester of academic year.
- Each theory paper shall carry 40 marks.
- The evaluation of the performance of the students in theory papers shall be on the basis of each semester examination of 200 marks.
- The evaluation of the performance of the students in practical shall be on the basis of annual examination of 200 marks
- Question Paper will be set in view of the / in accordance with the entire syllabus and preferably covering each unit of syllabi.

11. EQUIVALENCE IN ACCORDANCE WITH TITLES AND CONTENT OF PAPERS FOR REVISED SYLLABUS

Sr. No.	TITLE OF OLD PAPER	TITLE & CODE OF NEW PAPER
1	Paper IX – Molecular Biology	Course - IX (DSE – E57) - Molecular Biology
2	Paper X – Cell Biology	Course - XI (DSE – E58) - Genetic Engineering
3	Paper XI- Biomembrane Transport And Cytoskeleton	Course - XI (DSE – E59) - Biomembrane Transport And Cytoskeleton
4	Paper XII- Biochemical Techniques	Course – XII (DSE – E60) - Biochemical Techniques and Bioinformatics
5	Paper XIII – Neurochemistry	Course - XIII (DSE – F57) – Neurochemistry
6	Paper XIV – Cancer Biology	Course - XIV (DSE – F58) - Cancer Biology

7	Paper XV – Clinical Biochemistry	Course - XV (DSE – F59) – Clinical Biochemistry and Immunochemistry
8	Paper XVI – Fermentation Technology	Course - XVI (DSE – F60) - Fermentation Technology
9	Practical	Practical

12. OTHER FEATURES :

(A) **LIBRARY** : Reference and Text Books, Journals and Periodicals, Reference book list is mentioned below the course syllabus.

(B) **SPECIFIC EQUIPMENTS** : Necessary to run the Course –
OHP, Computer, L.C.D., Projector

(C) **LABORATORY SAFETY EQUIPMENTS** :

1) Fire extinguisher
2) First aid kit
3) Fumigation chamber
4) Stabilized power supply
5) Insulated wiring for electric supply.
6) Good valves, distribution pipes & regulators for gas supply.
7) Operational manuals for instruments.
8) Emergency exits

SHIVAJI UNIVERSITY, KOLHAPUR
B. Sc. III Biochemistry
Semester V

COURSE - IX   (DSE – E57) MOLECULAR BIOLOGY
(Credits 2, Total lectures - 45)

<u>Unit I</u>   **[23]**

Introduction to Transcription and Translation
1. Eucaryotic transcription and regulation: (all point at introductory level)
   a. RNA polymerase structure and assembly,
   b. RNA polymerase I, II, III,
   c. Transcription initiation, elongation and termination, activation and r

2. Splicing, RNA editing, Nuclear export of mRNA, mRNA stability, catalytic RNA
3. The translation machinery, ribosomes, composition and assembly,
4. Mechanism of eukaryotic translation
   a. Initiation
   b. Elongation
   c. Termination

<u>Unit II</u>   **[22]**

DNA repair and mutation
1. DNA repair
2. Photoreactivation,
3. Mismatch correction
4. SOS repair.

Types of Mutation
   a. Point mutations:-Nonsense and Missense
   b. Intragenic and intergenic suppression,
   c. Frameshift mutations,
   d. Physical, chemical and biological mutagens.

Recommended books:
1. Stryer L (1995) Biochemistry, 4 th edition, W. H. Freeman & company, New York.
2. Nelson and Cox, (2010), Lehninger's Principals of biochemistry.
3. Watson J. D., Hopkins, N. H., Roberts, J. W., Steitz, J. A. and Weiner, A. M. (1988) Molecular biology of the gene, 4 th edition, The Benjamin/Cummings publishing companies, inc, California.
4. Benjamin Lewin (1999) Genes (all volumes), oxford University Press, Oxford.
5. Weaver R. F. (1999) Molecular biology, WCB McGraw-Hill companies, Inc, New York.
6. Brown T A (1995) Essential molecular biology, vol. I, A practical approach, IRL press, Oxford.
7. Genes and Genomes Maxine Singer and Paul Berg

COURSE - X   (DSE – E58) GENETIC ENGINEERING
(Credits 2, Total lectures - 45)

<u>Unit I</u>

Introduction and tools of Genetic Engineering   **[22]**

1. Enzymes :- Restriction Endonuclease – introduction to class I, II, and III , eg EcoR1 BamH1 b. Reverse transcriptase c) S1 Nuclease d) DNA ligases c) Alkaline Phosphtase
2. Cloning vectors :- properties and construction of Plasmid pBR- 322, Cosmids, lamda phage
3. Passenger DNA - cDNA synthesis
4. Host e.g E. coli

<u>Unit II</u>

Techniques and Application of Genetic engineering   **[23]**

1.Gene cloning Techniques – hybridisation, r DNA synthesis, gene transfer methods, screening
2. Production of human insulin by r DNA technology
3. Principle, Working and application of PCR
4. Blotting techniques- southern and western blotting and their application
5. Application of genetic engineering.

Recommended books:

1. Genetic engineering by vermap.s
2. Principles of Gene Manipulation: An Introduction To Genetic Engineering" by Old RW and Primrose SB
3. Genetic Engineering (Oxford Higher Education)" by SmitaRastogi and Neelam Pathak
4. Genetic Engineering" by L M Narayanan and A Mani
5. Genetic Engineering" by Verma P S and Agarwal V K

COURSE - XI (DSE – E59) BIOMEMBRANE TRANSPORT AND CYTOSKELETON
(Credits 2, Total lectures - 45)

<u>**Unit I**</u>   **[22]**
Transport across biomembranes
Structure and function of plasma membrane (Sanger and Nicholson model)
1. Active , passive and facultative transport
2. Ion channels.
3. Symport and antiport system.
4. Organisation and significance of
    a. Na+ - K+ ATPase,
    b. Na+ - H+ ATPase,
    c. Ca++-ATPase pumps.
5. Endocytosis,
6. Pinocytosis and
7. Phagocytosis,
8. Receptor mediated endocytosis, transcyctosis.

<u>**Unit III**</u>   **[23]**
Specialized transport systems and Cytoskeleton
1. Gap junctions transport,
2. Nuclear pores transport,
3. Transport of water – Aquaporins
4. Elements of cytoskeleton
    a. Microtubules,
    b. Microfilaments and
    c. Intermediary filaments.

Recommended books:
1. Molecular Cell Biology by H. Lodish, David Baltimore, et al W. H. Freeman Publication, 1996
2. Biological Membranes Findlay and Evans
3. Biochemistry of Tissues by Banks
4. Cell by Cooper
5. Stryer L (1995) Biochemistry, 4 th edition, W. H. Freeman & company, New York.
6. Nelson and Cox, (2010), Lehninger's Principals of biochemistry.

COURSE - XII   (DSE – E60) BIOCHEMICAL TECHNIQUE AND BIONIFORMATICS
(Credits 2, Total lectures - 45)

<u>Unit I</u>   [22]
Basic of bioinformatics
1. Introduction to bioinformatics
2. Database
3. Information source (NCBI, GDB, MGD)
3. Information source (NCBI, GDB, MGD)
4. Database retrieval tool (ENTREZ, OMIM, PubMED)
5. Database similarity searching (BLAST)
6. Applications

<u>Unit II</u>   [23]
Chromatography
1. Principle, technique and applications of
    (Discussion should include selection of matrix, column packing sample application
    mechanical of separation important application and advantages)
             a. Affinity chromatography,
             b. HPLC
             c. Reverse phase chromatography,
             d. Gas chromatography
2. Electrophoresis
    1. Isoelectric focusing,
    2. Capillary electrophoresis
    3. Pulse field gel electrophoresis
    4. 2D electrophoresis

Recommended books:
  1) Protein Purification by Robert Scopes, Springer Verlag Publication, 1982
  2) Tools in Biochemistry David Cooper
  3) Methods of Protein and Nucleic acid Research, OstermanVol I – III
  4) Centrifugation D. Rickwood
  5) Practical Biochemistry, V th edition, Keth, Wilson and Walker.
  6) Bioinformatics by rastogi

Semester VI

COURSE - XIII   (DSE – F57) NEUROCHEMISTRY
(Credits 2, Total lectures - 45)

<u>Unit I</u>   [22]

Nervous system
An overview of
1. Central Nervous System,
2. Peripheral and Autonomic Nervous system.
3. Cells of Nervous System – Neurons, Astrocytes, Glial cells, Oligodendrocytes and Schwan cells.

Neurotransmission
1. Membrane potentials,
2. Action potential –
   a. Depolarization,
   b. Repolarization and
   c. Hyperpolarization,
3. Resting potential
4. Axonal Neurotransmission

Unit II   [23]

Neurotransmission and Disease of nervous system
1. Action of neurotransmitters
   a. Acetyl choline,
   b. GABA,
2. Agonists and Antagonists – their mode of action and effects
3. Disease of nervous system
   1. Parkinson's disease,
   2. Alzheimer's disease,
   3. Schizophrenia, and
   4. Multiple sclerosis.

Recommended books:
1. Neurochemistry by Ferdinand Hucho, VCH Publication, 1986
2. Molecular cell Biology,by Lodish, Baltimore, et al W.H. Freeman & Co. !996
3. Basic Neurochemistry by M. P. Spiegel

COURSE - XIV   (DSE – F58) CANCER BIOLOGY
(Credits 2, Total lectures - 45)
<u>**Unit I**</u>   **[22]**
Cancer cell
   1. Characteristics of cancer cell
   2. Types of cancer
            a. Benign
            b. Malignant
   3. Metastasis
   4. Tumor markers (CEA, AFP)
Carcinogen
     1. Chemical: - Base analogues, Alkyating agents and intercalating agents
        Physical: - Radiation energy
        Biological mutagens: - RNA and DNA Tumor viruses and Retrovirus viral oncogene

Unit II   **[23]**
Chemical Carcinogenesis and therapies
   1. Genetic and epigenetic carcinogens :- Src and Ras gene
   2. Procarcinogens and cocarcinogens,
   3. Mutagenic agents (Nicotine),
   4. Testing for carcinogenicity- Ames test.
   5. Physical, chemical and other therapies

Recommended books:
   1. Klaassen C D, Amdur M O &Doull J (1986) Casarett and Doull's Toxicology, III rd edition, Macmillan publishing company, New York. 26
   2. Williams P L&Burson J L (1985) Industrial Toxicology, Van- Nostrand Reinhold, New York.
   3. Hayes A W (1988) Principles and methods of toxicology, II nd edition, Raven press New York.
   4. Stewart C P&Stolman A (1960) Toxicology, vol I, Academic press, New York.

COURSE - XV   (DSE – F59) CLINICAL BIOCHEMISTRY AND IMMUNOCHEMISTRY
(Credits 2, Total lectures - 45)
<u>**Unit I**</u>   [22]
Laboratory setup and safety and enzymes in diagnosis and monitoring of disorders
Requirements of setting up of clinical laboratory, SI units in clinical laboratory, collection
preparation, preservation, and handling of clinical samples, quality control,

1. Use of enzyme in clinical biochemistry
   a. LDH,
   b. SGPT,
   c. SGOT,
   d. Acid and alkaline phosphatase,
   e. amylase,
In diagnosis and monitoring of disorders

<u>**Unit II**</u>   [23]
Liver
1. Bilirubin metabolism,
2. Types of jaundice and clinical assesment,
3. Kidney and heart
   a. Glomerular filtration rate
   b. Renal threshold and clearance value
   c. Role of enzyme in assessment of myocardial infraction
4. Immunochemistry (introductory level)
   a. Natural and acquired immunology
   b.Nature of immune response
   c. T cell and B cell
   d.Structure of IgG
   e. Antigen – antibody interaction
   f.Phagocytosis by microphages
   g. Radial, single, and double diffusion method

Recommended books:
1. Clinical Chemistry by Kaplan L.A. and Pesce A. J. C. V. Mosby, 1989
2. Clinical Biochemistry by W. J. Marshall and S. K. Bangert, Churchill Livinston N.Y. 1995
3. Practical Clinical Biochemistry (Varley) by Gowenlock
4. Biochemical Aspects of Human Diseases by Elkeles and Tavill
5. Textbook of Medical Physiology by A.C. Guyton and J. E. Hall, W.B. Saunders
   Publication, 9th Edition , 1996

COURSE - XVI (DSE – F60) FERMENTATION TECHNOLOGY
(Credits 2, Total lectures - 45)
<u>**Unit I**</u>   [22]
Upstream Processing
    1. Microbial cell growth and kinetics
    2. Growth Medium – micro and macronutrients
    3.Design and parts of fermenter
    4. Construction materials,

Various sterilization techniques for
    a. Solid,
    b. Liquid
    c. Gases,
    d. Aeration and agitation, foam, auxillary equipments

Unit II   [23]
Fermentation and downstream processing
    1. Batch,
    2. Fed-batch and
    3. Continuous fermentation
    4. Principle of techniques- cell homogenization, liquid-liquid extraction, filtration, distillation, ultrafiltration
    5. Industrial production of alcohol

Recommended books:
1) Moo-Young M. ed. (1985) Comprehensive Biotechnology vol: I & II, Pergamon Press N.Y.
2) Ratledge C and Kristiansen B. eds. (2001) Basic Biotechnology 2nd ed. Cambridge Univ Press Cambridge.
3) Old R.W and Primose S.D (1995) Principles of Gene Manipulation 5th ed. Blackwell Scientific Pub. Oxford.
4) Bailey J.E and Ollis D.F. (1986) Biochemical Engineering Fundamentals 2nd ed. McGraw Hill Book Company, N. Delhi.
5) Aiba S, Humphrey A. E. and N. F. Millis (1973) Biochemical Engineering, 2nd Edition University of Tokyo Press, Tokyo, Japan.

6) Stanbury P.F., Whitaker A, and Hall S.J. (1997) Principles of Fermentation Technology 2 nd ed.Aditya Books Pvt. Ltd, N.Delhi.
7) Mukhopadhaya S.N. (2001) Process Biotechnology Fundamentals.Viva Books Pvt. Ltd. N.Delhi.
8) Rehm H.J and Reed G. (1985) Biotechnology vol. I & II. VCH, Basel.
9) Stainer R. Y. Ingrahm J. L., Wheelis M. L. and Painter P. R. (1987) General Microbiology 5th Edition, Macmillan Press Ltd. London

Practical Course
Figures shown to the right indicate number of practical/s required.

A] Colorimetric estimations:-
1. Estimation of bacterial protein by Folin cio-calteu method. (1)
2. Quantitative estimation of amino acids by using ninhydrin method. (1)
3. Estimation of alcohol by $K_2Cr_2O_7$. (1)
4. Estimation of total carbohydrate by Phenol-H_2SO_4 method. (1)
5. Estimation of reducing sugar by DNSA method. (1)

B] Enzyme study:-
6. Study of amylase enzyme assay . (2)
7. Study of optimum pH of Amylase. (1)
8. Study of optimum temperature of Amylase. (1)
9. Study of substrate concentration on Amylase. (1)
10. Study of effect of activator on amylase activity. (1)
11. Study of effect of inhibitor on amylase activity. (1)
12. Production of Alcohol from Beker's yeast. (2)

C] Isolations:-
12. Isolation of Chromosomal DNA from liver. (2)
13. Isolation & characterization of photosynthetic pigment chlorophyll a & b from plant. (2)
14. Isolation and characterization of Glycogen from rat liver. (1)

D] Chromatography:-

15. Preparation and activation of TLC plates. (1)
16. Separation of amino acids or sugars by using TLC. (1)
17. Separation and identification of amino acid mixture by 2D paper chromatography. (1)
18. Determination of capacity of ion exchange resin [Dowex 50]. (1)

E] Electrophoresis & Other Instrument based practicals:-

19. Preparation of gel and its casting in tray/tube. (1)
20. Separation of protein by gel electrophoresis . (1)
21. Separation of DNA by agarose gel electrophoresis. (1)
22. Titration curve of glycine by using pH meter. (1)
23. Detection of changes in confirmation of Protein by viscosity measurement. (1)
24. Study of cell lysis by homogenization or sonication method. (1)
25. Study of U.V. absorption spectra of biomolecules (Protein, nucleic acid, pigments). (1)
26. Detection of blood glucose by using Glucometer. (1)

F] Demonstration:-

27. Demonstration of Western blotting technique. (2)
28. Demonstration of PCR(1)
29. Demonstration of HPLC(1)
30. Demonstration of Fermenter(1)
31. Demonstration of transport of amino acids across the intestine. (1)
32. Separation of proteins by using molecular sieve chromatography.(1)

Recommended Books:-

1. An introduction to Practical biochemistry- David Plummer,

2. Laboratory manual in biochemistry- Jayraman, Wiley Estern Ltd.New Dilli.

3. Modern Experimental Biochemistry-Rodny Boyer, Addison Wesley –Longman Pte Ltd.

4. Biochemical methods- Sadashivam and Manikam

5. Introductory Practical Biochemistry-Sawhney S.K. and Randhir Singh (Narosa publication).

6. Hawk's Physiological Chemistry-Oser

7. Viva and Practical Biochemistry-Dr. A. C. Deb (New central book Limited).

Practical Examination

A) The practical examination will be conducted on four (4) consecutive days for not less than 5 hours on each day of the practical exanimation.

B) Each candidate must produce a certificate from the Head of the Department in his/her college stating that he/she has completed in a satisfactory manner the practical course on the guidelines laid down from time to time by Academic Council on the recommendation of Board of studies and has been recorded his/her observations in the laboratory journal and written a report on each exercise performed. Every journal is to be checked and signed periodically by a member teaching staff and certified by the Head of the Department at the end of staff and certified by the Head of the Department at the end of the year. Candidates are to produce their journal at the time of practical examination. Candidates have to visit the least Two (2) places of biochemical interest (Pharmaceutical industry, Dairy, Food, Research institutes etc.) and submit the report of their visit at the time of examination. The report should be duly certified by the Head of the Department.

List of the minimum equipments and related requirements for B. Sc. III

1) Rotary shaker	: One
3) Centrifuge (High Speed)	: One
4) Hot plate	: One
5) Hot air oven	: One
6) Incubator	: One
7) Spectrophotometer	: One
8) Water bath	: One
9) Separate room for fine instruments of size 10'x15' feet dimension	: One
10) Electrophoresis assembly	: one
11) Distillation assembly	: One (Glass)
12) Reflux assembly	: Four

13) Refrigerator	: One
14) Colorimeter	: One
15) Chromatography assembly	: Four
16) Chromatography column	: Four
17) pH meter [digital]	: Two
18) Viscometer	: Four
19) Homogenization	: One
20) Sonicator	: One
21) Spectrophotometer	: One
22) Glucometer.	: One

23) Western blotting assembly

24) PCR

25) HPLC

26) Fermentor

NATURE OF QUESTION PAPER FOR THEORY IS SAME AND COMMON AS PER UNIVERSITY PATTERN

THE NATURE OF QUESTION PAPER FOR B.SC. PART III BIOCHEMISTRY PRACTICAL EXAMINATION WILL INCLUDE:

Q. Major Experiment

Q. Minor Experiment

Q. Journal

Q. Project Report:

Q. Study Tour Report

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SHIVAJI UNIVERSITY, KOLHAPUR.

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Revised Syllabus For

Bachelor of Science Part -III

INDUSTRIAL MICROBIOLOGY

CBCS PATTERN

Syllabus to be implemented from

June,2020 onwards.

Shivaji University, Kolhapur

Revised Syllabus For Bachelor of Science Part - III : Industrial Microbiology

1. TITLE : Industrial Microbiology

2. YEAR OF IMPLEMENTATION: Revised Syllabus will be implemented from June, 2020 onwards.

3. PREAMBLE: This syllabus is framed to give sound knowledge with understanding of Industrial Microbiology to undergraduate students at third year of three years of B.Sc. degree course.

Students learn Industrial Microbiology as a separate subject from B.Sc. I. The goal of the syllabus is to make the study of Industrial Microbiology popular, interesting and encouraging to the students for higher studies including research.

The new and updated syllabus is based on a basic and applied approach with vigour and depth. At the same time precaution is taken to make the syllabus comparable to the syllabi of other universities and the needs of industries and research. The syllabus is prepared after discussion at length with number of faculty members of the subject and experts from industries and research fields. The units of the syllabus are well defined, taking into consideration the level and capacity of students.

4. DURATION : The course shall be a full time course.

5. PATTERN: Pattern of Examination will be Semester.

6. MEDIUM OF INSTRUCTION : The medium of instruction shall be English.

7. PROGRAMME SPECIFIC OUTCOME OF INDUSTRIAL MICROBIOLOGY

The programme specific outcome of the B.Sc –III syllabus in Industrial Microbiology will enrich the students with

- Knowledge regarding basic, advanced and applicable concepts in emerging areas of Industrial Microbiology.
- Skills required for their careers in various industries, research and various branches of Life Sciences.

8. STRUCTURE OF COURSE :

1) B.Sc.III : Total Number of Papers - 8

Sr No	Subjects	Marks
	ANNUAL V	
1.	Course – IX	40+10
2.	Course – X	40+10
3.	Course – XI	40+10
4.	Course – XII	40+10
	ANNUAL VI	
5.	Course – XIII	40+10
6.	Course – XIV	40+10
7.	Course – XV	40+10
8.	Course - XVI	40+10
	PRACTICALS	
1.	Practical – I	50
2.	Practical – II	50
3.	Practical – III	50
4.	Practical - IV	50
Total		600

2) Structure and Titles of Papers of B.Sc.III Industrial Microbiology Course :

Annual -V

Course IX : Environmental Microbiology

Course X : Basic techniques of Biotechnology

Course XI   : Quality assurance and quality control of fermented products.

Course XII   : Microbial productions of metabolites and bioinsecticides

Annual -VI

Course XIII   : Environmental pollution and control

Course XIV : Applications of Biotechnology

Course XV   : Industrial management, Government laws and regulations.

Course XVI : Microbial fermentations, Foods and Biofuels.

9. Course specific outcome:

Course : B.Sc III

Course IX DSCC 27	Environmental Microbiology	Exploring microbial activities in soil, marine,textile,petroleum mines
Course X DSCC 28	Basic Techniques in Biotechnology	Techniques in Biotechnology and molecular biology
Course XI DSCC 29	Quality Assurance and Quality Control in Industrial Products	Rules and regulations of the regulatory authorities in QA and QC
Course XII DSCC 30	Microbial Production of Metabolites and Bioinsecticide	Industrial microbial production of health and agricultural products
Course XIII DSCC 27	Environmental Pollution and Control	Study of pollution, parameters , its assessment and monitoring in different environment
Course XIV DSCC 28	Applications of Biotechnology	Use of Biotechnology in applied fields like agriculture, industry, medical and Environment
Course XV DSCC 29	Industrial Management, Government laws and Regulations	Industrial management and laws in effective running of industry
Course XVI DSCC 30	Microbial Fermentations, Foods and Biofuels	Microbial production of liquors, biofuels and use of microbes in foods
Practical	Practical based on the above theory	Students gain knowledge / skills and techniques applied in the field of Industrial Microbiology

10. SCHEME OF TEACHING AND EXAMINATION:

[The scheme of teaching and examination should be given as applicable to the course / paper concerned.]

Sr. No	Subject/Course	Teaching Scheme(Hours/Week)			
		L	T	P	Total
1.	Course IX and X	3			
2.	Course XI and XII	3			
3.	Course XIII and XIV	3			12
4.	Course XV and XVI	3			
5.	Practical – I			5	
6.	Practical – II			5	20
7.	Practical – III			5	
8.	Practical - IV			5	
	Total				32

B.Sc part III (Industrial Microbiology) SEMESTER- V

Course -IX	Course-IX-DSCC-27 (CREDITS:02;TOTALHOURS:45) ENVIRONMENTAL MICROBIOLOGY	No .of lectures per Credit

UnitI/ CreditI	**ROLE OF MICROORGANISMS IN ENVIRONMENT**
	
	A) SOIL ENVIRONMENT
	   a. Introduction,physical,chemical,microbial characters.
	   b. Microbial interactions in soil & their role in soil fertility
	
	B) ELEMENTAL CYCLES
	   a. Carbon cycle, Nitrogen cycle, Sulfur cycle, Phosphorus cycle
	   b. Role of microorganisms in elemental cycles
		22

UnitII/Cr edit II	**EXPLORING MICROORGANISMS ASSOCIATED WITH VARIOUS ENVIRONMENTS**
	
	A) MICROORGANISMS IN VARIOUS ENVIRONMENTS
	a)Petroleum Microbiology :
	   1. Types of compounds in petroleum.
	   2. Microorganisms in hydrocarbon system.
	   3. Role of microorganisms in hydrocarbon degradation.
	b)Marine Microbiology:
	   1. Characters of marine environment.
	   2. Characters of marine microorganisms.
	   3. Role of marine microorganisms.
	c) Astromicrobiology (space capsule):
	   1. Characteristics of space environment.
	   2. Microorganisms in the astro-environment.
	   3. Characteristics of microbes.
	
	B) ROLE OF MICROORGANISMS IN BIOLEACHING AND TEXTILE INDUSTRY
	a) Bioleaching of elements
	   1. Introduction, microorganisms involved,
	   2. Chemistry of microbial leaching and beneficiation
	   3. Leaching methods – Laboratory and in situ leaching of copper and uranium.
		23

b) Textile Industry
1. Introduction, types of microorganisms found on textile fibres,
2. Conditions favoring the action of microorganisms,
3. Types of destruction caused by microorganisms (cotton and wool) & its prevention .

Course -X	Course-XDSCC-28 (CREDITS:02;TOTALHOURS:45) **Basic Techniques of Biotechnology**	No.of lectures
Unit I/ Credit I	GENETIC ENGINEERING	22

	A) BASIC CONCEPT OF GENETIC ENGINEERING
	    a. **Introduction**
	    b. **Tools of genetic engineering**
	    1. Cutting and joining enzyme.
	    2. Cloning Vectors – Plasmids, phage, cosmids, and artificial chromosomes- BAC & YAC
	    3. Cloning organisms.
	B) TECHNIQUES OF GENETIC ENGINEERING
	    a. Isolation of DNA
	    b. Construction of rDNA – Genomic library, cDNA library
	    c. Insertion of foreign DNA into a vector – Use of restriction enzymes, linkers, Homopolymer tails, adaptors, polylinkers.
	    d. Transfer of recombinant DNA in Bacterial Cell Transformation, transfection
	    e. Selection of recombinants (Bacteria) - Direct selection of recombinants, Blue white screening methods	

Unit II/ Credit II	**TECHNIQUES IN MOLECULAR BIOLOGY**	23

	A) TECHNIQUES IN MOLECULAR BIOLOGY
	  a. Blotting Techniques
	    1. Southern blotting
	    2. Northern blotting
	    3. Western blotting
	    4. DOT-BLOT technique
	  b. Techniques of Detection and Analysis of Nucleic Acid
	    1. Radioactive labeling – Nick translation
	    2. Non Radioactive labeling – Horse Radish Peroxide (HRP) method
	    c. **DNA sequencing**– Sanger's method **Gene editing –** CRISPR-CAS technique
	
	B) PROTEIN ENGINEERING, IMMOBILIZATION AND PCR
	    a. **Protein Engineering:** Definition, methods and application.
	    b. **Gene mapping**
	    c. **PCR –** Requirements, working, different types of PCRs, PCR product analysis, advantages & disadvantages, applications. Chemical synthesis of gene	

Course-XI	Course-XIDSCC-29 (CREDITS:02;TOTALHOURS:45) **QUALITY ASSURANCE AND QUALITY CONTROL IN INDUSTRIAL PRODUCTS**	
Unit I/ Credit I	**INDUSTRIAL RULES & STANDARDS AS PER IP, BP, USP, EP**	**22**

	A) INDIAN PHARMACOPOEIA :
	    a. Introduction
	    b. Concept of pharmacopoeia
	    c. Concept of regulatory authorities
	    d. Types of pharmaceutical products
	    e. Microbiological Q.C
	
	B) ASSAY OF MICROBIAL PRODUCTS AS PER INDIAN PHARMACOPOEIA:
	    a. Alcohol & Acetic acid
	    b. Vit. A & Vit. D
	    c. Bacitracin	

Unit II/ Credit II	**VALIDATION AND QUALITY CONTROL IN PHARMA INDUSTRIES**	**23**

	A) QUALITY CONTROL TESTS OF PHARMACEUTICAL PRODUCTS
	    a. Sterility test
	    b. Pyrogen test
	    c. Toxicity test
	    d. Carcinogenicity test
	    e. Mutagenicity test
	    f. Allergy test
	
	B) INTERNATIONAL STANDARDS AS PER WHO, ISI, AND VALIDATION IN PHARMACEUTICAL INDUSTRY
	    a. WHO & ISI standards.
	    b. Validation & in-process monitoring of sterilization procedures
	    c. Validation of Laminar Air Flow Cabinet	

Course -XII	Course-XIDSCC-30 (CREDITS:02;TOTALHOURS:45) **MICROBIAL PRODUCTION OF METABOLITES AND BIOINSECTICIDES**	
UnitI/ Credit I	**MICROBIAL PRODUCTION OF VITAMINS, ORGANIC ACIDS AND ANTIBIOTICS**	**22**

	A) Microbial Production of Vitamins:
	   a. Vitamin B12 - Organism used, production method-process, recovery and assay.
	   b. Vitamin C - Organism used production method, process, recovery and assay.
	   c. Vitamin A - Organism used, production method, process, recovery, and assay
	B) Microbial Production of organic acid
	   a. Gluconic acid
	   b. Indole Acetic Acid
	   c. Itaconic acid
	C) Production of Antibiotics:
	   a. Bacitracin
	   b. Chloramphenicol	

Unit II/ Credit II	**PRODUCTION SAFETY, MERITS, EFFECTIVITY OF BIOPESTICIDES, TOXOIDS, SCP**	**23**

	PRODUCTION OF ANTIBIOTICS AND TOXOIDS
	A)Biopesticides:
	   a. B. t. Bacillus thuringiensis
	   b. Baculovirus heliathius
	   c. Trichoderma
	
	B)Production of toxoids:
	   a. Diptheria
	   b. Tetanus
	   c. Botulism
	
	C)SCP
	   a. Yeast
	   b. Algae
	   c. Bacteria	

Course - XIII	**Course- XIII DSCC-27** (**CREDITS:02;TOTALHOURS:45**) **ENVIRONMENTAL POLLUTION AND CONTROL**	
Unit I/ Credit I	**ENVIRONMENTAL MONITORING AND E.M.S. & E.I.A.**	**22**

	A) ENVIRONMENTAL MONITORING :
	  a. Environmental Monitoring &Bioburden Tests
	  b. E.M.S. (Environmental Monitoring System): Concept & Process in dairy industry
	
	B) BIOSAFETYand E.I.A.
	
	  a. E.I.A. (Environmental Impact Assessment): Concept & Process of assessment
	  b. Biosafety in Laboratories and Pharmaceutical Industries.	

Unit II/ Credit II	**CHARACTERISTICS OF WASTE**	**23**

	WASTE WATER TREATMENT :
	A) Characteristics of Waste Water as per CPCB norms
	B) Treatment Procedures :
	  a. Physical treatment – Sedimentation, screening and removal of oil and grease.
	  b. Biological treatments - Septic tank, bio filter, activated sludge, extended aeration, oxidation ponds, anaerobic digestion-UASB (Up flow Anaerobic Sludge Blanket), Root zone technology
	  c. Chemical treatment – Coagulation by alum/lime/polyelectrolyte /disinfection.
	  C) Characteristics and treatment of solid & liquid wastes of –
	  a. Sugar Industry
	  b. Distillery
	  c. Dairy Industry
	  D) Eutrophication – Classification of lakes, sources of nutrients, consequences and control.	

Course - XIV	Course- XIVDSCC-28 (CREDITS:02;TOTALHOURS:45) **APPLICATIONS OF BIOTECHNOLOGY**	
Unit I/ Credit I	**APPLICATIONS IN AGRICULTURE, ENVIRONMENT& INDUSTRY**	**22**

	A) APPLICATIONS OF GENETIC ENGINEERING IN AGRICULTURE
	
	   a. **Transgenic plants** – concepts, methods for raising transgenic plants and applications.
	   b. **Transgenic animals** – Concepts, methods for raising transgenic animals and applications.
	
	B) APPLICATIONS OF GENETIC ENGINEERING IN ENVIRONMENT
	
	   a. **Bioremediation -** Use of naturally occurring microorganisms and GEMs
	
	C) APPLICATIONS OF GENETIC ENGINEERING IN INDUSTRY
	   a. **GEMs in industry:** Pharmaceutical and food industry	

Unit II/ Credit II	**APPLICATIONS IN MEDICAL FIELD**	**23**

	A) MONOCLONAL ANTIBODIES AND RECOMBINANT VACCINES
	   a. **Monoclonal antibodies -** Definition, production- Hybridoma technology, applications.
	   b. **Recombinant vaccines -** Definition, recombinant vector vaccines, DNA vaccines, Multivalent subunit vaccines, mini cell vaccines, conjugate vaccines.
	B) PRODUCTION OF rDNA PRODUCTS AND MERITS, DEMERITS OF BIOTECHNOLOGY
	   a. **rDNA Products:** Insulin, Somatostatin, interferons, abzymes, immunotoxins
	   b. **Merits & Demerits of Biotechnology**
	   c. **Diagnostic techniques**
	      a. Detection of human and plant pathogens- ELISA, RIA
	      b. TB detection:
	      1. Genexpert test
	      2. Line probe assay	

Course -XV	Course- XVDSCC-29 (CREDITS:02;TOTALHOURS:45) **INDUSTRIAL MANAGEMENT, GOVERNMENT LAWS AND REGULATIONS**	
Unit I/ Credit I	**CONCEPTS OF MANAGEMENT AND ENTREPRENEURSHIP**	**22**

	A)**Enterpreneurship** – Principles of management, management meaning and importance, Concept of Entrepreneurship.
	B)**Concepts of Management:**
	  a. **Planning meaning and importance**
	  b. **Organizing -** Meaning and process of organization
	  c. **Communication –** Meaning and process control techniques.
	  d. **Personal Management –** Man power planning
	  e. **Purchase and store management –** Concept of quotation, tenders, comparative statement, inspection and quality control, store management.
	  f. **Concept of marketing –** Basic Concepts, Costing, Pricing
	  g. **Financial management –** Fund raising, costing and pricing.	

UNIT II/ CREDIT II	**NATIONAL AND INTERNATIONAL LAWS RELATED TO INDUSTRIAL REGULATION AND TAXATION**	**23**

	A) Basic concepts and laws relating to its infringement
	  a. Patent, Bio patent, Copyright, Trade secret, Trademark, Geographical Indications, Designs, its
	  b. IPR and WTO, TRIPS
	  c. Industrial development and regulation act 19 object, licensing and registration
	B) Concept of tax, principles of taxation, types of tax.
	Good and service tax 2017, features and benefits of GST	

Course - XVI	Course- XVI DSC C-30 (CREDITS:02; TOTAL HOURS : 45) **MICROBIAL FERMENTATIONS, FOODS AND BIOFUELS**	
Unit I/ Credit I	**PRODUCTION OF SCP, MUSHROOM, PROBIOTICS & INDIAN MADE FOREIGN LIQUORS**	22

	A) Production of SCP
	  a. Introduction
	  b. Production – Algae, Bacteria, Yeast
	  c. Product quality and safety
	B) Production of Mushrooms
	  a. Introduction & types
	  b. Spawn production
	  c. Mushroom Production & harvesting
	C) Probiotics
	  a. Introduction & common properties of probiotics
	  b. Examples of probiotic microorganism
	  c. Use of probiotic
	D) Microbial production of indian made foreign liquors- gin, whiskey & rum
	  a. Introduction
	  b. Production Process
	  c. Quality of Product	

Unit II/ Credit II	**PRODUCTION OF VINEGAR, EXOPOLYSACCARIDES & BIOFUELS`**	23

	A) Vinegar production
	  a. Introduction & Mechanism of vinegar production
	  b. Production process : Orlean's process, Trickling type generator, Submerged culture method
	  c. Types & Uses of vinegar
	B) Microbial Production of Exopolysaccharides
	  a. Introduction & Mechanism of synthesis
	  b. Production process of Xanthan & Dextran gum
	  c. Applications of xanthan and dextran gums
	C) Production of biofuels
	  a. Ethanol- microorganisms used, fermentation conditions, recovery, purification of Ethanol
	  b. Biogas- Biomass used, microbiology & Biochemistry of biogas production, models used, uses of biogas
	  c. Biodiesel production from Algae	

B.Sc. III INDUSTRIAL MICROBIOLOGY:
PRACTICAL COURSE:

Course V	PRACTICAL COURSE V (CREDITS:02; TOTAL HOURS:180)	No. of lectures per credit
Credit I	**Major Experiments** 1. Determination of MIC of Cr, using suitable microbes. 2. Determination of MIC of Cu, using suitable microbes. 3. Estimation of BOD of industrial effluents. 4. Determination of COD of industrial effluents. 5. Isolation of hydrocarbon degrading microorganisms. 6. Isolation of plastic degrading microorganisms **Minor Experiments :** 1. Determination of oil and grease from industrial waste. 2. Estimation of TS, TSS, TVS, TDS from sewage and industrial effluent. 3. Estimation of chlorine dose of potable water. 4. Validation of Autoclave as per IP 5. Validation of Laminar air flow	
Credit II	**Major Experiments :** 1. Isolation of genomic DNA from bacteria 2. Isolation of genomic DNA from yeast. 3. Isolation of plasmid DNA from bacteria. 4. Transformation in E. coli. 5. Isolation of Vit B_{12} requiring mutants of E. coli using UV. 6. Preparation of TAB vaccine. 7. Demonstration of DNA amplification by PCR. 8. Identification of protein by western blot.	

	Minor Experiments :	
	1. Electrophoresis of plasmid DNA by Agarose gel electrophoresis. 2. Electrophoresis of protein by PAGE. 3. Estimation of DNA by diphenylamine method. 4. Estimation of RNA by orcinol method. 5. Preparation of protoplast of bacterial cells. 6. Protoplast fusion of bacterial cells. 7. ELISA	

Course VI	**PRACTICAL COURSE VI** **(CREDITS:02; TOTAL HOURS:60)**	No. of lectures per credit
Credit I	**Major Experiments :** 1. SPC and identification of pathogens from - Formulation syrup 2. SPC and identification of pathogens from Tooth paste 3. SPC and identification of pathogens from Tablets 4. Bioassay of Vit. B_{12} 5. Bioassay of Penicillin 6. Cultivation of edible mushrooms 7. Production of Biogas from organic waste 8. Production of alcohol from molasses 9. Bioassay of Bacitracin as per IP 10. Production of IAA **Minor Experiments :** 1. Chemical assay of Vit C. 2. Chemical assay of Penicillin 3. Isolation of amino acid producers 4. Quantification of amino acids 5. Estimation of alcohol 6. Chemical Assay of IAA	
Credit II	1. Compulsory "on Job training" in Industry / Institute for minimum period of one week and submission of report. 2. Project work	

Reference Books:

BOOK	AUTHOR
SOIL MICROBIOLOGY	N.S.SUBBARAO
SOIL MICROBIOLOGY	ALEXANDER
NATURE AND PROPERTIES OF SOIL	BRADY
MODERN SOIL MICROBIOLOGY	D.V.EALASJAN
METHODS IN ENVIORNMENTAL ANALYSIS –WATER SOIL AND AIR	P. K. GUPTA
AQUATIC ECOLOGY	R.RAGOTHAMAN
WATER,ENVIRONMENT AND POLLUTION	KUMAR
AIR,ENVIRONMENT AND POLLUTION	S .S.PUROHIT
MICROBIOLOGY	PELCZAR
MICROBIAL BIOGEOCHEMISTRY	ZAJIC
WATER AND WASTE WATER TECHNOLOGY	HAMMER AND HAMMER
ECOLOGY, ENVIRONMENT AND POLLUTION	PUROHIT AND RANJAN
WASTE WATER TREATMENT	RAO AND DATTA
ENVIRONMENTAL CHEMICAL HAZARDS	KUMAR
AN INTRODUCTION TO AIR POLLUTION	TRIVEDI AND GOEL
ENVIRONMENTAL AND METAL POLLUTION	KHAN
ENVIRONMENTAL POLLUTION	KATYAL AND SATAKE
ENVIRONMENTAL POLLUTION ANALYSIS	S.M. KHOPKAR
WASTE WATER TREATMENT	M. N. RAO
ECOLOGY OF POLLUTED WATER VOLUME 1	KUMAR
AIR POLLUTION	RAO
AEROBIOLOGY	TILAK
ENVIRONMENTAL POLLUTION	PUROHIT AND AGARWAL
GENE BIOTECHNOLOGY	S.N.JOGDAND
PRINCIPLES OF GENE MANIPULATION	PRIMROSE,TWYMAN AND OLD
BIOTECHNOLOGY- FUNDAMENTALS AND APPLICATIONS	S.PUROHIT
GENETIC ENGINEERING AND ITS APPLICATIONS	P.JOSHI
BIOTECHNOLOGY-FUNDAMENTALS AND APPLICATIONS	NAIDU
TEXTBOOK OF BIOTECHNOLOGY	CHATWAL
BIOTECHNOLOGY	DUBEY
RECENT TRENDS IN BIOTECHNOLOGY	V. S. HARIKUMAR
BIO-TECHNOLOGY- FUNDAMENTALS AND APPLICATIONS	S. S. PUROHIT
PROTEIN BIOTECHNOLOGY	HAZARE
BIOTECHNOLOGY	BARNUM
PHARMACOLOGY & PHARMACOTHERAPEUTICS	R.S.SATOSKAR
PHARMACEUTICAL MICROBIOLOGY	W.B.HUGO
PHARMACEUTICAL MICROBIOLOGY	PUROHIT,SALUJA AND KAKRANI
PHARMACEUTICAL MICROBIOLOGY	HUGO AND RUSSEL
PHARMACEUTICAL MICROBIOLOGY	S. S. PUROHIT, RAJIV RAJAN.
INDIAN PHARMACOPEIA	
FERMENTATION TECHNOLOGY	PEPPLER
PREVENTION OF FOOD ADULTERATION ACT 1954 Industrial Microbiology Indian Pharmacopoeia Latest Edition European pharmacopoeia latest edition	E.L. MANASI

COMMON NATURE OF QUESTION FOR THEORY PAPER MENTIONED SPERATELY:

Practical Examination

A) Exam will be conducted on 3 consecutive days for not less than 6 hours on each day.
B) Each candidate must produce a certificate from the Head of the Department in his/her college stating that he/she has completed in a satisfactory manner the practical course on the guidelines laid down from time to time by Academic Council on the recommendation of Board of studies and has been recorded his/her observations in the laboratory journal and written a report on each exercise performed. Every journal is to be checked and signed periodically by a member teaching staff and certified by the Head of the Department at the end of staff and certified by the Head of the Department at the end of the year. Candidates are to produce their journal at the time of practical examination. Candidates have to visit the least Two (2) places of Microbiological interest (Pharmaceutical industry, Dairy, Research institutes etc.) and submit the report of their visit at the time of examination.
C) Each candidate must undergo on job training in an industry / institute for minimum 1 week and submit the report.
D) The candidates are required to undertake a project and submit the project report

Nature Of Question Paper And Distribution Of Marks For B.Sc. III Industrial Microbiology Practical Examination

PRACTICAL I

Q.1 Major Experiment	**20 Marks**
Q.2 Minor Experiment	**15 Marks**

PRACTICAL II

Q.1 Major Experiment	**20 Marks**
Q.1 Major Experiment	**15 Marks**

PRACTICAL III

Q.1 Major Experiment	**20 Marks**
Q.2 Minor Experiment	**15 Marks**

PRACTICAL IV

Q.1 Project   **35 Marks**

Q5. ON JOB TRAINING   **20 Marks**

Q6. JOURNAL   **20 Marks**

Q7. SPOTTING / VIVA COURSE   **10 Marks**

Q8. TOUR REPORT   **10 Marks**

SU/BOS/Science/348   Date: 24/06/2024.

To,

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

Subject: Regarding Minor Change syllabi of M.Sc. Part-I (Sem.I & II) as per NEP-2020 (2.0) degree programme under the Faculty of Science and Technology.

Ref: SU/BOS/Science/556 Date: 25/07/2023 Letter.

Sir/Madam,

With reference to the subject mentioned above, I am directed to inform you that the university authorities have accepted and granted approval to the Minor Change in syllabi, nature of question paper and equivalence of M.Sc. Part-I (Sem. I & II) as per NEP-2020 (2.0) degree programme under the Faculty of Science and Technology.
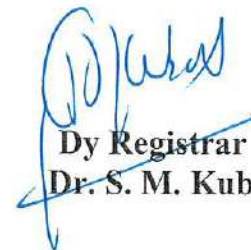
M.Sc.Part-I (Sem. I & II) as per NEP-2020 (2.0)			
1.	Chemistry	3.	Sugar Technology (Entire)
2.	Alcohol Technology (Entire)	4.	

This syllabus, nature of question shall be implemented from the academic year 2024-2025 onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website www.unishivaji.ac.in,NEP-2020@suk(Online Syllabus).

The question papers on the pre-revised syllabi of above-mentioned course will be set for the examinations to be held in October /November 2024 & March/April 2025. These chances are available for repeater students, if any.

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

Thanking you,

Dy Registrar
Dr. S. M. Kubal

Copy to:

1	The Dean, Faculty of Science & Technology	4	P.G Admission / Eligibility Section
2	The Chairman, Respective Board of Studies	5	Computer Centre/ Eligibility Section
3	B.Sc. Exam/ Appointment Section	6	Affiliation Section (U.G.) (P.G.)

Shivaji University, Kolhapur

Accredited By NAAC with

'A^{++}' Grade

Revised Syllabus as per NEP-2020

For

M. Sc. Part-I

Chemistry

Syllabus to be implemented from

July, 2023 onwards.

Applicable for University Department and Affiliated Colleges PG Centres

Minor Changes in M.Sc. I NEP-2020 Chemistry Sem. I & II Syllabus To be implemented from 2024-25		
M. Sc. I Sem I		
Paper-	**RM-CH106 Research Methodology**	
	Present	**Corrected (to be implemented from 2024-25)**
Unit I	Research Methodology	A) Introduction to Research Methodology B) Scope of Research and Ethics- Additional points are added.
UNIT-II	Literature Searching and Writing Reports	Literature Search and Techniques: The sub points have been modified and techniques are added.
UNIT-III	Quantitative Techniques	Scientific report writing- Old Unit II is modified by adding new points.
UNIT-IV	Computer Applications: Use of Computer Programs	A) Quantitative Techniques B) Computer Applications: Presentation and Communication skills- This unit is modified by combining unit III and Unit IV (Old) with addition of few more points.
M. Sc. I Sem II		
Paper-	**PCH201: Physical Chemistry-II**	
	Present	**Corrected (to be implemented from 2024-25)**
UNIT-III	Electrochemistry	Electrochemistry- Theory of strong electrolytes- Debye-Huckel theory and subpoints are replaced by electrokinetic phenomena.
Paper-	**ACH202: Analytical Chemistry-II**	
UNIT-I	Basics of Analytical Chemistry, Errors, treatments and statistics	Basics of Analytical Chemistry and Indian Knowledge System(IKS) – Introduction to IKS is added.
Practical Examination Days		
	Present	**Corrected (to be implemented from 2024-25)**
	No. of Days = 04	No. of Days = 03

SHIVAJI UNIVERSITY, KOLHAPUR
Revised Syllabus for the Master of Science in Chemistry
(As per NEP - 2020)
Applicable from the Academic Year 2023 –24

1. **Title**: M. Sc. Chemistry, Shivaji University, Kolhapur Revised Syllabus as per NEP - 2020.

2. **Faculty**: Faculty of Science and Technology.

3. **Year of Implementation**: For M. Sc. I (Semester I and Semester II): From July 2023 and for M. Sc. II (Semester III and Semester IV): From June 2024.

4. Program Outcomes (POs):

a) Demonstrate, solve, and have an understanding of major concepts in all disciplines of Chemistry.

b) Solve problems, think methodically, and independently and draw logical conclusions.

c) Employ critical thinking and scientific knowledge to design, carry out, record, and analyze the results of chemical reactions.

d) Create an awareness of the impact of Chemistry on the environment, society, and development among the scientific community.

e) Find out the green route for the chemical reactions for sustainable development.

f) To inculcate scientific temperament in the students and among the scientific community.

g) Use modern techniques, sophisticated equipment, and various Chemistry softwares

5. Program-Specific Outcomes (PSOs):

a) Students will develop critical thinking and the Analytical mind by taking knowledge in advanced-level Chemistry

b) The relevance of the extension of Chemistry in the social context for solving social issues

c) Analytical or experimental skills make the students capable of doing higher-level research work in the emerging fields of Chemistry

d) Students will gain a thorough Knowledge of the subject to work on projects at different research and academic institutions.

e) Students will become familiar with the different branches of Chemistry like Analytical, Organic, Inorganic, Physical, Environmental, Polymer, and Biochemistry. They will also learn to apply appropriate techniques for the qualitative and quantitative analysis of chemicals in laboratories and in industries.

f) Employability Skills shall enable the students to find jobs in core Chemistry and other related fields

g) Entrepreneurial Skills shall empower the students to start their industries/businesses in core Chemistry fields

6. The entire course of M. Sc. (Chemistry) will be of **four Semesters** spread over two years.

7. Pattern of Examination: The Examinations will be conducted **semester wise for theory and Practical.**

8. Fee structure: As per Shivaji University guidelines.

9. Eligibility criteria for Admission: B. Sc. in Chemistry.

10. Medium of Instruction: English

11. Structure of course: Given in Framework Chart

The University department and University affiliated colleges centers offers following specializations at M. Sc. II (Semester III and IV):

i) Physical Chemistry

ii) Inorganic Chemistry

iii) Organic Chemistry

iv) Analytical Chemistry

v) Applied Chemistry (Only at University Department)

vi) Industrial Chemistry (Only at University Department)

12. Scheme of Teaching and Examination:

(Applicable to University Department and University affiliated colleges centers)

a. Each unit in theory course shall comprise 15 lectures, each of 60 minutes' duration and there shall be four lectures per theory course per week.

b. Entire course of M. Sc. Chemistry will be of **2200** marks.

c. Examination of each **theory course** shall be of **100 marks** (80 university examination + 20 internal assessment). University examination of 80 marks (3 hours' duration) will be conducted at the end of each Semester. Internal assessment of 20 marks will be done before the semester examination during each semester.

d. Examination of practical course shall be of 150 marks per semester for first year and 50 Marks for second year.

e. Research Project is compulsory at second year. (10 Credits)

f. On-the Job training is mandatory at second semester (4 Credits)

g. Seminar activity is compulsory for M. Sc. II year students.

h. Question papers will be set in the view of the entire syllabus and preferably covering each unit of the syllabus. Equal weightage should be provided to each unit.

13. Standard of Passing:

There will be separate passing for theory courses and practical courses. Minimum 40% marks will be required for passing separately for theory and practical courses.

14. Nature of Question paper and scheme of marking:

- Theory question paper: Maximum marks -80

- Total No. of question – 7

- All questions are of equal marks. Out of these seven questions five questions are to be attempted. Question No.1 is compulsory and objective/short answer type. Total number of bits is 16 with one mark each. Total marks – 16 (which cover multiple choices, fill in the blanks, definition, true or false). These questions will be answered along with other questions in the same answer book.

- Remaining 6 question are divided into two sections, namely section-I and section – II. Four questions are to be attempted from these two section such that not more than two questions from any of the section. Both sections are to be written in the same answer book.

Shivaji University, Kolhapur
Credit Frameworks for M.Sc. Programs as per NEP to be implemented in 2023-24
M.Sc. Inorganic Chemistry

Year	Level	Sem	Major		RM	OJT/FP	RP	Cumm. Cr.	Degree
			Mandatory	Elective [Chose any one elective]					
I	6.0	I	OCH101 (4 Cr) ICH102 (4 Cr) PRCH104 (4 Cr-Major Experiments- **5 from each Section**) PRCH105 (2 Cr-Minor Experiments-**3 from each Section**)	E-ICH103 (4 Cr) OR E-OCH103 (4 Cr) OR E-PCH103 (4 Cr) OR E-ACH103 (4 Cr) OR	RM-CH106 (4 Cr)	---	---	22	**PG Diploma in Inorganic Chemistry (After 3yr B.Sc. Degree)** **Note: Common practicals for M.Sc.-I** **M.Sc.- II will be discipline specific i.e. Inorganic Chemistry oriented**
		II	PCH201 (4 Cr) ACH202 (4 Cr) PRCH204 (4 Cr-Major Experiments- **5 from each Section**) PRCH205 (2 Cr-Minor Experiments-**3 from each Section**)	E-ICH203 (4 Cr) OR E-OCH203 (4 Cr) OR E-PCH203 (4 Cr) OR E-ACH203 (4 Cr)	---	OJT-ICH206 (4 Cr) OR FP-ICH206 (4 Cr) [Any One]	---	22	
Cum. Cr. for PG Diploma			**28**	**8**	**4**	**4**		**44**	
Exit option: PG Diploma (40-44 Credits) after Three Year UG Degree									
II	6.5	III	ICH301 (4 Cr) ICH302 (4 Cr) ICH303 (4 Cr) PR-ICH305 (2 Cr)	E-ICH304 (4 Cr) OR E-OCH304 (4 Cr) OR E-PCH304 (4 Cr) OR E-ACH304 (4 Cr) OR	---	---	RP-ICH306 (4 Cr)	22	**PG Degree After 3-Yr UG Or PG Degree after 4-Yr UG** **Note: All the practicals/Project will be discipline specific i.e.Inorganic Chemistry oriented**
		IV	ICH401 (4 Cr) ICH402 (4 Cr) ICH403 (4 Cr)	E-ICH404 (4 Cr) OR E-OCH404 (4 Cr) OR E-PCH404 (4 Cr) OR E-ACH404 (4 Cr) OR	---	---	RP-ICH405 (6 Cr)	22	
Cum. Cr. For 1 Year PG Degree			**28**	**8**	**4**	**4**	**10**	**44**	
Cum. Cr. For 2 Year PG Degree			**54**	**16**	**4**	**4**	**10**	**88**	
2 Years-4 Sem. PG Degree (88 credits) after Three Year UG Degree or 1 Year-2 Sem PG Degree (44 credits) after Four Year UG Degree									

Abbreviations: Yr.: Year; Sem.: Semester; OJT: On Job Training: Internship/ Apprenticeship; FP: Field projects; RM: Research Methodology; Research Project: RP; Cumulative Credits: Cum. Cr. **Research Methodology will be common for all but the codes will be maintained different.**

M.Sc. Organic Chemistry

Year	Level	Sem	Major		RM	OJT/FP	RP	Cumm. Cr.	Degree
			Mandatory	Elective [Chose any one elective]					
I	6.0	I	OCH101 (4 Cr) ICH102 (4 Cr) PRCH104 (4 Cr-Major Experiments- **5 from each Section**) PRCH105 (2 Cr- Minor Experiments-**3 from each Section**)	E-ICH103 (4 Cr) OR E-OCH103 (4 Cr) OR E-PCH103 (4 Cr) OR E-ACH103 (4 Cr) OR	RM-CH106 (4 Cr)	---	---	22	**PG Diploma in Organic Chemistry (After 3yr B.Sc. Degree)** **Note: Common practicals for M.Sc.-I** **M.Sc.- II will be discipline specific i.e. Organic Chemistry oriented**
		II	PCH201 (4 Cr) ACH202 (4 Cr) PRCH204 (4 Cr-Major Experiments- 5 from each Section) PRCH205 (2 Cr-- Minor Experiments-3 from each Section))	E-ICH203 (4 Cr) OR E-OCH203 (4 Cr) OR E-PCH203 (4 Cr) OR E-ACH203 (4 Cr)	---	OJT-OCH206 (4 Cr) OR FP-OCH206 (4 Cr) [Any One]	---	22	
Cum. Cr. for PG Diploma			**28**	**8**	**4**	**4**		**44**	
Exit option: PG Diploma (40-44 Credits) after Three Year UG Degree									
II	6.5	III	OCH301 (4 Cr) OCH302 (4 Cr) OCH303 (4 Cr) PR-OCH305 (2 Cr)	E-ICH304 (4 Cr) OR E-OCH304 (4 Cr) OR E-PCH304 (4 Cr) OR E-ACH304 (4 Cr) OR	---	---	RP-OCH306 (4 Cr)	22	**PG Degree After 3-Yr UG Or PG Degree after 4-Yr UG** **Note: All the practicals/Project will be discipline specific i.e.Organic Chemistry oriented**
		IV	OCH401 (4 Cr) OCH402 (4 Cr) OCH403 (4 Cr)	E-ICH404 (4 Cr) OR E-OCH404 (4 Cr) OR E-PCH404 (4 Cr) OR E-ACH404 (4 Cr) OR	---	---	RP-OCH405 (6 Cr)	22	
Cum. Cr. For 1 Year PG Degree			**28**	**8**	**4**	**4**	**10**	**44**	
Cum. Cr. For 2 Year PG Degree			**54**	**16**	**4**	**4**	**10**	**88**	
2 Years-4 Sem. PG Degree (88 credits) after Three Year UG Degree or 1 Year-2 Sem PG Degree (44 credits) after Four Year UG Degree									

Abbreviations: Yr.: Year; Sem.: Semester; OJT: On Job Training: Internship/ Apprenticeship; FP: Field projects; RM: Research Methodology; Research Project: RP; Cumulative Credits: Cum. Cr. **Research Methodology will be common for all but the codes will be maintained different.**

M.Sc. Physical Chemistry

Year	Level	Sem	Major		RM	OJT/FP	RP	Cumm. Cr.	Degree
			Mandatory	Elective [Chose any one elective]					
I	6.0	I	OCH101 (4 Cr)	E-ICH103 (4 Cr) OR E-OCH103 (4 Cr) OR E-PCH103 (4 Cr) OR E-ACH103 (4 Cr) OR	RM-CH106 (4 Cr)	---	---	22	**PG Diploma in Physical Chemistry (After 3yr B.Sc. Degree) Note: Common practicals for M.Sc.-I** **M.Sc.- II will be discipline specific i.e. Physical Chemistry oriented**
			ICH102 (4 Cr)						
			PRCH104 (4 Cr-Major Experiments- **5 from each Section**)						
			PRCH105 (2 Cr- Minor Experiments-**3 from each Section**)						
		II	PCH201 (4 Cr)	E-ICH203 (4 Cr) OR E-OCH203 (4 Cr) OR E-PCH203 (4 Cr) OR E-ACH203 (4 Cr)	---	OJT-PCH206 (4 Cr) OR FP-PCH206 (4 Cr) [Any One]	---	22	
			ACH202 (4 Cr)						
			PRCH204 (4 Cr-Major Experiments- **5 from each Section**)						
			PRCH205 (2 Cr- Minor Experiments-**3 from each Section**)						
Cum. Cr. for PG Diploma			**28**	**8**	**4**	**4**		**44**	
Exit option: PG Diploma (40-44 Credits) after Three Year UG Degree									
II	6.5	III	PCH301 (4 Cr)	E-ICH304 (4 Cr) OR E-OCH304 (4 Cr) OR E-PCH304 (4 Cr) OR E-ACH304 (4 Cr) OR	---	---	RP-PCH306 (4 Cr)	22	**PG Degree After 3-Yr UG Or PG Degree after 4-Yr UG** <mark>**Note: All the practicals/Project will be discipline specific i.e.Physical Chemistry oriented**</mark>
			PCH302 (4 Cr)						
			PCH303 (4 Cr)						
			PR-PCH305 (2 Cr)						
		IV	PCH401 (4 Cr)	E-ICH404 (4 Cr) OR E-OCH404 (4 Cr) OR E-PCH404 (4 Cr) OR E-ACH404 (4 Cr) OR	---	---	RP-PCH405 (6 Cr)	22	
			PCH402 (4 Cr)						
			PCH403 (4 Cr)						
Cum. Cr. For 1 Year PG Degree			**28**	**8**	**4**	**4**	**10**	**44**	
Cum. Cr. For 2 Year PG Degree			**54**	**16**	**4**	**4**	**10**	**88**	
2 Years-4 Sem. PG Degree (88 credits) after Three Year UG Degree or 1 Year-2 Sem PG Degree (44 credits) after Four Year UG Degree									

Abbreviations: Yr.: Year; Sem.: Semester; <mark>OJT: On Job Training: Internship/ Apprenticeship; FP: Field projects; RM: Research Methodology;</mark> <mark>Research Project: RP;</mark> Cumulative Credits: Cum. Cr. **Research Methodology will be common for all but the codes will be maintained different.**

M.Sc. Analytical Chemistry

Year	Level	Sem	Major		RM	OJT/FP	RP	Cumm. Cr.	Degree
			Mandatory	**Elective [Chose any one elective]**					
I	6.0	I	OCH101 (4 Cr) ICH102 (4 Cr) PRCH104 (4 Cr-Major Experiments- **5 from each Section**) PRCH105 (2 Cr- Minor Experiments-**3 from each Section**)	E-ICH103 (4 Cr) OR E-OCH103 (4 Cr) OR E-PCH103 (4 Cr) OR E-ACH103 (4 Cr) OR	RM-CH106 (4 Cr)	---	---	22	**PG Diploma in Analytical Chemistry (After 3yr B.Sc. Degree) Note: Common practicals for M.Sc.-I**
		II	PCH201 (4 Cr) ACH202 (4 Cr) PRCH204 (4 Cr-Major Experiments- **5 from each Section**) PRCH205 (2 Cr- Minor Experiments-**3 from each Section**)	E-ICH203 (4 Cr) OR E-OCH203 (4 Cr) OR E-PCH203 (4 Cr) OR E-ACH203 (4 Cr)	---	OJT-ACH206 (4 Cr) OR FP-ACH206 (4 Cr) [Any One]	---	22	**M.Sc.- II will be discipline specific i.e. Analytical Chemistry oriented**
Cum. Cr. for PG Diploma			**28**	**8**	**4**	**4**		**44**	
Exit option: PG Diploma (40-44 Credits) after Three Year UG Degree									
II	6.5	III	ACH301 (4 Cr) ACH302 (4 Cr) ACH303 (4 Cr) PR-ACH305 (2 Cr)	E-ICH304 (4 Cr) OR E-OCH304 (4 Cr) OR E-PCH304 (4 Cr) OR E-ACH304 (4 Cr) OR	---	---	RP-ACH306 (4 Cr)	22	**PG Degree After 3-Yr UG Or PG Degree after 4-Yr UG Note: All the practicals /Project will be discipline specific i.e. Analytical Chemistry oriented**
		IV	ACH401 (4 Cr) ACH402 (4 Cr) ACH403 (4 Cr)	E-ICH404 (4 Cr) OR E-OCH404 (4 Cr) OR E-PCH404 (4 Cr) OR E-ACH404 (4 Cr) OR	---	---	RP-ACH405 (6 Cr)	22	
Cum. Cr. For 1 Year PG Degree			**28**	**8**	**4**	**4**	**10**	**44**	
Cum. Cr. For 2 Year PG Degree			**54**	**16**	**4**	**4**	**10**	**88**	
2 Years-4 Sem. PG Degree (88 credits) after Three Year UG Degree or 1 Year-2 Sem PG Degree (44 credits) after Four Year UG Degree									

Abbreviations: Yr.: Year; Sem.: Semester; OJT: On Job Training: Internship/ Apprenticeship; FP: Field projects; RM: Research Methodology; Research Project: RP; Cumulative Credits: Cum. Cr. **Research Methodology will be common for all but the codes will be maintained different.**

M.Sc. Industrial Chemistry

Year	Level	Sem	Major		RM	OJT/FP	RP	Cumm. Cr.	Degree
			Mandatory	**Elective [Chose any one elective]**					
I	6.0	I	OCH101 (4 Cr) ICH102 (4 Cr) PRCH104 (4 Cr-Major Experiments- **5 from each Section**) PRCH105 (2 Cr- Minor Experiments-**3 from each Section**)	E-ICH103 (4 Cr) OR E-OCH103 (4 Cr) OR E-PCH103 (4 Cr) OR E-ACH103 (4 Cr) OR	RM-CH106 (4 Cr)	---	---	22	**PG Diploma in Industrial Chemistry (After 3yr B.Sc. Degree) Note: Common practicals for M.Sc.-I** **M.Sc.- II will be discipline specific i.e. Industrial Chemistry oriented**
		II	PCH201 (4 Cr) ACH202 (4 Cr) PRCH204 (4 Cr-Major Experiments- **5 from each Section**) PRCH205 (2 Cr- Minor Experiments-**3 from each Section**)	E-ICH203 (4 Cr) OR E-OCH203 (4 Cr) OR E-PCH203 (4 Cr) OR E-ACH203 (4 Cr)	---	OJT-INDCH206 (4 Cr) OR FP-INDCH206 (4 Cr) [Any One]	---	22	
Cum. Cr. for PG Diploma			**28**	**8**	**4**	**4**		**44**	
Exit option: PG Diploma (40-44 Credits) after Three Year UG Degree									
II	6.5	III	INDCH301 (4 Cr) INDCH302 (4 Cr) INDCH303 (4 Cr) PR-INDCH305 (2 Cr)	E-ICH304 (4 Cr) OR E-OCH304 (4 Cr) OR E-PCH304 (4 Cr) OR E-ACH304 (4 Cr) OR	---	---	RP-INDCH306 (4 Cr)	22	**PG Degree After 3-Yr UG Or PG Degree after 4-Yr UG** <mark>**Note: All the practicals /Project will be discipline specific i.e. Industrial Chemistry oriented**</mark>
		IV	INDCH401 (4 Cr) INDCH402 (4 Cr) INDCH403 (4 Cr)	E-ICH404 (4 Cr) OR E-OCH404 (4 Cr) OR E-PCH404 (4 Cr) OR E-ACH404 (4 Cr) OR	---	---	RP-INDCH405 (6 Cr)	22	
Cum. Cr. For 1 Year PG Degree			**28**	**8**	**4**	**4**	**10**	**44**	
Cum. Cr. For 2 Year PG Degree			**54**	**16**	**4**	**4**	**10**	**88**	
2 Years-4 Sem. PG Degree (88 credits) after Three Year UG Degree or 1 Year-2 Sem PG Degree (44 credits) after Four Year UG Degree									

Abbreviations: Yr.: Year; Sem.: Semester; <mark>OJT: On Job Training: Internship/ Apprenticeship; FP: Field projects; RM: Research Methodology;</mark> <mark>Research Project: RP</mark>; Cumulative Credits: Cum. Cr. **Research Methodology will be common for all but the codes will be maintained different.**

M.Sc. Applied Chemistry

Year	Level	Sem	Major		RM	OJT/FP	RP	Cumm. Cr.	Degree
			Mandatory	**Elective [Chose any one elective]**					
I	6.0	I	OCH101 (4 Cr) ICH102 (4 Cr) PRCH104 (4 Cr-Major Experiments- **5 from each Section**) PRCH105 (2 Cr- Minor Experiments-**3 from each Section**)	E-ICH103 (4 Cr) OR E-OCH103 (4 Cr) OR E-PCH103 (4 Cr) OR E-ACH103 (4 Cr) OR	RM-CH106 (4 Cr)	---	---	22	**PG Diploma in Applied Chemistry (After 3yr B.Sc. Degree) Note: Common practicals for M.Sc.-I** **M.Sc.- II will be discipline specific i.e. Applied Chemistry oriented**
		II	PCH201 (4 Cr) ACH202 (4 Cr) PRCH204 (4 Cr-Major Experiments- (**5 from each Section**) PRCH205 (2 Cr- Minor Experiments-(**3 from each Section**)	E-ICH203 (4 Cr) OR E-OCH203 (4 Cr) OR E-PCH203 (4 Cr) OR E-ACH203 (4 Cr)	---	OJT-APCH206 (4 Cr) OR FP-APCH206 (4 Cr) [Any One]	---	22	
Cum. Cr. for PG Diploma			**28**	**8**	**4**	**4**		**44**	
Exit option: PG Diploma (40-44 Credits) after Three Year UG Degree									
II	6.5	III	APCH301 (4 Cr) APCH302 (4 Cr) APCH303 (4 Cr) PR-APCH305 (2 Cr)	E-ICH304 (4 Cr) OR E-OCH304 (4 Cr) OR E-PCH304 (4 Cr) OR E-ACH304 (4 Cr) OR	---	---	RP-APCH306 (4 Cr)	22	**PG Degree After 3-Yr UG Or PG Degree after 4-Yr UG Note: All the practicals /Project will be discipline specific i.e. Applied Chemistry oriented**
		IV	APCH401 (4 Cr) APCH402 (4 Cr) APCH403 (4 Cr)	E-ICH404 (4 Cr) OR E-OCH404 (4 Cr) OR E-PCH404 (4 Cr) OR E-ACH404 (4 Cr) OR	---	---	RP-APCH405 (6 Cr)	22	
Cum. Cr. For 1 Year PG Degree			**28**	**8**	**4**	**4**	**10**	**44**	
Cum. Cr. For 2 Year PG Degree			**54**	**16**	**4**	**4**	**10**	**88**	
2 Years-4 Sem. PG Degree (88 credits) after Three Year UG Degree or 1 Year-2 Sem PG Degree (44 credits) after Four Year UG Degree									

Abbreviations: Yr.: Year; Sem.: Semester; OJT: On Job Training: Internship/ Apprenticeship; FP: Field projects; RM: Research Methodology; Research Project: RP; Cumulative Credits: Cum. Cr. **Research Methodology will be common for all but the codes will be maintained different.**

M. Sc. Part – I (Semester – I)

OCH101: Organic Chemistry-I [Credit 4, 60 L Hours]	
UNIT-I	**15 L**
A) Reaction Mechanism: Structure and Reactivity [8L]	
Types of reactions, strength of acids and bases. Generation, structure, stability, and reactivity of carbenes, arynes, nitrenes, and effect of structure on reactivity, resonance, and steric effects. Thermodynamic and Kinetic requirements, Introduction to Kinetic and Thermodynamic control reaction.	
B) Aliphatic Nucleophilic substitutions [7L]	
SN_2, SN_1 and SNi reactions with respect to mechanism and stereochemistry. Nucleophilic substitutions at allylic, aliphatic trigonal, benzylic, and vinylic carbons. Reactivity, the effect of substrate structure, the effect of attacking nucleophiles, leaving groups, and reaction medium. SN reactions at bridgehead carbon, competition between SN_1 and SN_2, Ambident nucleophiles, Neighboring Group Participation.	
UNIT-II	**15 L**
A) Introduction to aromaticity in Benzenoid and non–Benzenoid compounds [7 L]	
Three, four, and five-membered systems. tropone, tropolone, and tropylium salts.	
B) I- Aromatic Electrophilic Substitutions [6 L]	
Introduction, the arenium ion mechanism, orientation and reactivity in Nitration, Sulphonation, Friedel-Crafts, and Halogenation in aromatic systems, energy profile diagrams. The ortho/para ratio, ipso attack, and orientation in their ring systems. Diazo-coupling, Vilsmeier-Hack reaction, Von Richter rearrangement.	
II-Nucleophilic aromatic substitution reactions SN_1, SN_2 [2 L]	
UNIT-III	**15 L**
A) Elimination Reactions [5 L]	
The E_1, E_2 and E_{1cB} mechanisms. Orientation in elimination reactions. Hoffmann versus Saytzeff elimination, Reactivity: effects of substrate structures, attacking base, the leaving group, the nature of medium on elimination reactions. Pyrolytic elimination reactions.	
B) Study of the following reactions [10 L]	
Mechanism of condensation reaction involving enolates, Benzoin, Stobbe, Robinson annulation, Simon-Smith, Vlhmann, Mc-Murry, Prins, Wurtz-Fittig reaction, Hunsdiecker	

reaction, Pummerer, Corey-Chaykovsky reaction, Nef reaction, Passerini reaction, Baylis-Hilman reaction, Mitsunobu Reaction.	
UNIT-IV **Stereochemistry** Concept of chirality, prochiral relationship, homotopic, enantiotopic, and diasteriotopic groups, and faces. Racemic modifications and their resolution. R and S nomenclature. Conformational analysis: Cyclohexane derivatives, stability, and reactivity, Conformational analysis of disubstituted cyclohexanes. Introduction of optical activity in the absence of chiral carbon.	**15 L**
RECOMMENDED BOOKS: 1. A Guidebook to Mechanism in Organic Chemistry (Orient-Longmans)- PeterSykes 2. Organic Reaction Mechanism (Benjamin) R. Breslow 3. Mechanism and Structure in Organic Chemistry (Holt Reinh.)E. S. Gould. 4. Organic Chemistry (McGraw-Hill) Hendrikson, Cram and Hammond. 5. Basic principles of Organic Chemistry (Benjamin) J. D. Roberts and M. C. Caserio. 6. Reactive Intermediates in Organic Chemistry (John Wiley) N. S. Issacs. 7. Stereochemistry of Carbon Compounds. (McGraw-Hill) E.L.Eliel 8. Organic Stereochemistry (McGraw-Hill) by Hallas. 9. Organic Reaction Mechanism (McGraw-Hill) R. K. Bansal. 10. Organic Chemistry- R. T. Morrison and R. N. Boyd,(Prentice Hall.) 11. Modern Organic Reactions (Benjamin) H. O. House. 12. Principle of Organic Synthesis- R.O.C. Norman and J. M. Coxon. (ELBS) 13. Reaction Mechanism in Organic Chemistry- S. M. Mukharji and S. P. Singh. 14. Stereochemistry of Organic Compounds by D. Nasipuri. 15. Advanced Organic Chemistry (McGraw-Hill) J. March. 16. Introduction to Stereochemistry (Benjamin) K. Mislow. 17. Stereochemistry by P. S. Kalsi (New Age International)	
ICH102: Inorganic Chemistry-I [Credit 4, 60 L Hours]	
UNIT-I **Chemistry of Transition Elements** General characteristics and properties of transition elements, Coordination chemistry of	**15 L**

transition metal ions, Stereochemistry of coordination compounds, Crystal field theory (CFT) for tetrahedral, octahedral, square pyramidal, square planar, and trigonal bipyramidal fields, Crystal field stabilization energy (CFSE), Factors affecting the crystal field splitting parameters, Strong and weak field complexes, Spectrochemical series, Jahn-Teller Distortion, Applications of CFT for defining kinetic properties of complexes and site selections of cations, anions in spinels. Molecular orbital theory (MOT) for octahedral complexes involving sigma- and pi-bonding, and for tetrahedral complexes.	
UNIT-II **Organometallic Chemistry** Definition and criteria of organometallic compounds, Classification of organometallic compounds based on hapticity and polarity of M-C bond, Nomenclature and general characteristics, 18 electron rule-applications and exceptions, Synthesis, bonding, properties and reactivity of representative organometallic compounds (-CO, -NO, -alkene, -alkyne), Reactions of organometallic compounds: Oxidative addition, reductive elimination, Insertion and elimination, Organometallics in homogeneous catalysis: Hydrogenation of olefins, hydroformylation reaction, Monsanto Acetic Acid, and polymerization of olefins.	**15 L**
UNIT-III **Transition Metal Carbonyls and Related Compounds** Introduction, Preparation, structure, physical and chemical properties of metal carbonyls, Anionic and cationic carbonyl complexes, Lewis base derivatives of carbonyls, Carbonylhydrides, Carbonyl halides, Miscellaneous derivatives of metal carbonyls, Nitrosyl complexes of transition metals, complexes of molecular nitrogen, Cyanide complexes of transition metals.	**15 L**
UNIT-IV **Molecular Symmetry and Group Theory** Introduction to Symmetry, Symmetry operations, Symmetry elements, Point group and its classification (Cn-type, Dn-type, Special-type), Schoenflies symbol for point groups, Group and its Properties, Group multiplication table, Matrix representation of symmetry elements, Reducible and Irreducible representations, Properties of Irreducible representation, Great orthogonal theorem (without proof) and its importance, Construction of character table for water molecule, Mulliken symbolism rules for irreducible representations,	**15 L**
RECOMMENDED BOOKS:	

1. Fundamental Concepts of Inorganic Chemistry (Vol I to VII), A.K. Das and M. Das, CBS Publishers.

2. A. F. Wells, Structural Inorganic Chemistry– 5th edition(1984)

3. J. H. Huheey, Inorganic Chemistry-Principles, structure and reactivity, Harper and Row Publisher, Inc. New York(1972)

4. J. D. Lee, Concise Inorganic Chemistry, Elbs with Chapman and Hall, London

5. A. R. West, Plenum, Solid State Chemistry, and its applications

6. H. J. Emeleus and A. G. Sharpe, Modern Inorganic Chemistry

7. A. R. West, Basic Solid State Chemistry, 2nd edition

8. M. C. Dayand J. Selbin, Theoretical Inorganic Chemistry, Reinhold, EWAP

9. A. H. Hanney, Solid State Chemistry, A. H. Publications

10. O. A. Phiops, Metals, and Metabolism

11. Cullen Dolphin and James, Biological aspects of Inorganic Chemistry

12. Williams, An Introduction to Bioinorganic Chemistry

13. M. N. Hughes, Inorganic Chemistry of Biological Processes

14. Ochi, Bioinorganic Chemistry

15. F.A. Cotton, R.G. Wilkinson. Advanced Inorganic Chemistry

16. Willam L. Jooly, Modern Inorganic Chemistry

17. Manas Chanda, Atomic Structure and Chemical Bonding

18. N. N. Greenwood and A. Earnshaw, Chemistry of elements, Pergamon

19. S. J. Lippard, J. M. Berg, Principles of bioinorganic Chemistry, University Science Books

20. G. L. Eichhron, Inorganic Biochemistry, Vol I and II, Elesevier

21. Progress Inorganic Chemistry,Vol18 and38,J.J.Loppard,Wiley

22. Inorganic Chemistry, P. Atkins, T. Overtone, J. Rourke, M. Weller, F. Armstrong, 5th Eds., Oxoford University Press.

23. Inorganic Chemistry, H. E. House, Elsevier Publishers.

E-OCH103 Elective Paper: Organic Chemistry-II [Credit 4, 60 L Hours]	
UNIT-I	**15 L**
Study of the following rearrangements Curtius, Lossen, Witting, Neber, Orton, Hofmann-Martius, Demjanov, Dakin, Rupe, Gabriel–Colman, Carroll, Payne, Favorskii, Sommelet-Hauser, Stevens.	
UNIT-II	**15 L**

Study of Coupling Reactions Heck, Suzuki, Stille, Nigeshi, Sonogashira, Buchwald-Hartwig, Cadiot-Chodkiewicz, A^3, Kumada, Ulman, Chanlam, Hiyama coupling, Tsuji-Trost reaction.	
UNIT-III **Oxidation** Applications of oxidizing agents: Woodward-Prevost hydroxylation, Chloranil, and hydrogen peroxide. Swern oxidation. PCC (Corey's reagent), PDC (Cornforth reagent), Baeyer-Villiger oxidation. Dakin oxidation, Ceric Ammonium Nitrate (CAN), Sodium Hypochlorite, The Babler Oxidation, Corey Kim Oxidation, Wacker Oxidation, $NaIO_4$ and HIO_4, Etard oxidation.	**15 L**
UNIT-IV **Reductions** Study of following reductions- Catalytic hydrogenation using homogeneous and heterogeneous catalysts. Study of the following reducing reagents and reactions: Metal complex hydrides, Wolff-Kishner, Birch, Sodium in alcohol, Fe in HCl, Adam's catalyst, Lindlar catalyst, TBTH, Corey-Bakshi-Shibata reduction (CBS reagent), Zinc borohydride, Luche reduction ($CeCl_3$, $NaBH_4$, MeOH).	**15 L**
RECOMMENDED BOOKS: 1. Modern Synthetic Reactions-(Benjamin) H. O. House. 2. Reagents in Organic Synthesis-(John Wiley) Fieser and Fieser 3. Principles of Organic Synthesis-(Methuen) R. O. C. Norman 4. Hydroboration- S. C. Brown. 5. Advances in Organometallic Chemistry- (A.P.)F. C. A. Stone and R. West. 6. Organic Chemistry (Longman)Vol. I & Vol. II- Finar 7. Oxidation by-(Marcel Dekker) Augustin 8. Advanced Organic Chemistry 2nd Ed. R R. Carey and R. J. Sundburg 9. Organic Synthesis-(Prentice Hall)R. E. Ireland. 10. Homogeneous Hydrogenation-(J. K.) B. R. James. 11. Comprehensive Organic Chemistry- (Pargamon) Barton and Ollis. 12. Organic Reactions- R. Adams. 13. Some Modern Methods of Organic Synthesis-(Cambridge) W. Carruthares. 14. Organic Chemistry- Jonathan Clayden	

E-ICH103 Elective Paper: Inorganic Chemistry -II   [Credit 4, 60 L Hours]

Unit I **Non-aqueous solvents** Classification of solvents, Characteristics of solvents, Types of reactions in solvents, Physical and chemical properties of the non-aqueous solvents such as liquid ammonia, sulfur dioxide, dinitrogen tetroxide, anhydrous sulphuric acid, and molten salts.	**15 L**
Unit II **Nuclear and Radiochemistry** Nuclear stability and nuclear binding energy, Radioactivity, and radioactive decay, Classification of nuclear reactions, Nuclear reaction cross section, Nuclear fission, Nuclear fusion, Artificial or Induced Radioactivity, Designing, and constructions of Nuclear Reactors, Nuclear Reactors in India, Applications of radioactivity in agriculture, medical field, and industry.	**15 L**
Unit III **Bioinorganic Chemistry** Role of metal ions in biological processes, structure and properties of metalloproteins, porphyrines, metalloenzymes, oxygen transport, electron transfer reactions, cytochromes, ferredoxins and iron sulfur proteins, ion transport across membranes, Nitrogen fixation-nitrogenase, metal complexes in medicines	**15 L**
Unit IV **Solid State Chemistry** Crystal structure, Crystal types, Crystal defects, Electronic structure of solids, Band theory, Theory of Metals, Semiconductors and Insulators, Superconductivity, optical and magnetic properties, Solid state reactions, AB[Nickelarsenide(NiAs)], AB_2[fluorite(CaF_2) and anifluorite], layer structure [cadmium chloride and iodide ($CdCl_2$ & CdI_2)]	**15 L**
RECOMMONDED BOOKS: 1. J. E. Huheey, Inorganic Chemistry- Principles, structure and reactivity, Harper and Row Publisher, Inc. New York (1972) 2. J. D. Lee, Concise inorganic Chemistry, Elbs with Chapman and Hall, London 3. M.C. Dayand J. Selbin, Theoretical Inorganic Chemistry, Reinhold, EWAP 4. Jones, Elementary coordination Chemistry 5. Martell, Coordination Chemistry 6. T. S. Swainand D. S.T. Black, Organometallic Chemistry 7. John Wulff, structure and properties of materials, vol–4, electronic properties, Wiley	

Eastern

8. L. V. Azoroff, J. J .Brophy, Electronic processesing materials, McCraw Hill

9. F.A. Cotton, R. G. Wilkinson. Advanced Inorganic Chemistry

10. Willam L. Jooly, Modern Inorganic Chemistry

11. Manas Chanda, Atomic Structure and Chemical bonding

12. P. L.Pauson, Organometallic Chemistry

13. H. S. Sisler, Chemistry in non–aqueous solvents, Reinhold Publishing Corporation, USA,4th edition (1965)

14. H. J. Arnikar, Essentials of Nuclear Chemistry

15. Friedlander, Kennedy and Miller, Nuclear and Radiochemistry.

16. Fundamental Concepts of Inorganic Chemistry (Vol I to VII), A. K. Das and M. Das, CBS Publishers.

17. Inorganic Chemistry, P. Atkins, T. Overtone, J. Rourke, M. Weller, F. Armstrong, 5th Eds., Oxford University Press.

18. Inorganic Chemistry, H. E. House, Elsevier Publishers.

E-PCH103 Elective Paper: Physical Chemistry-I [Credit 4, 60 L Hours]	
UNIT-I **PHOTOCHEMISTRY** Absorption of light, laws of photochemistry, electronic structure of molecules, molecular orbital,electronicallyexcitedsingletstates,designationbasedonmultiplicity rule, construction of Jablonski diagram, electronic transition, Frank Condon principle, selection rules, intensity of absorption bands, nature of electronic spectra and primary process, photo- dissociation, pre-dissociation, Photo physical phenomena: photo-physical pathways of excited molecular system(radiative and non-radiative), prompt fluorescence, delayed fluorescence, and phosphorescence, fluorescence quenching: concentration quenching, collisional quenching, quenching by excimer and exciplex emission, fluorescence resonance energy transfer between photo-excited donor and acceptor systems. Stern-Volmer relation, critical energy transfer distances, energy transfer efficiency, examples and applications in chemical analysis. Photochemical reactions, photo-oxidation, photoreduction, photo- dimerization, photoisomerization and photosensitized reactions. Photochemistry of environment: Greenhouse effect. Numerical Problems	**15 L**
UNIT-II **ELECTROCHEMISTRY**	**15 L**

Ion-ion interaction: Debye-Huckel Theory, limited and extended law. Ion transport in solution: Fick's laws of diffusion, Einstein relation between diffusion coefficient and ionic mobilities, The Nernst-Einstein equation, relation between absolute and conventional mobilities. Abnormal ionic conductance of hydroxyl and hydrogen ions. batteries –Acid and alkaline storage batteries, Li ion battery	
UNIT III **BIOPHYSICAL CHEMISTRY** Introduction to biophysical chemistry: Amino acids, peptide, proteins, enzymes, nucleic acids: Introduction to primary, secondary, tertiary and quaternary structures, acid base properties. Intermolecular forces: H-bonding, Van der Waals forces, Lenard-Jones potential, columbic interactions, 1-4 interactions, hydrophobic hydration and interaction. Protein folding/defolding phenomena, use of spectroscopic and thermodynamic tools for protein-ligand binding equilibrium study, hydrodynamic and equilibrium thermodynamic methods for determination of molar mass of biological macromolecules.	**15 L**
UNIT-IV **MACROMOLECULES** Macromolecules: Mechanism of polymerization, molecular weight of a polymer (Number and mass average) viscosity average molecular weight, numerical problems. Degree of polymerization and molecular weight, practical significance of polymer molecular weight, methods of determining molecular weights (Osmometry, viscometry, light scattering, diffusion and ultra centrifugation) Chemistry of polymerization: Ceiling temperature, Free radical polymerization (Initiation, propagation and termination), kinetics of free radical polymerization, step growth polymerization (Polycondensation), molecular weight distribution, kinetics of step polymerization, cationic and anionic polymerization. Electronically conducting polymers, thermodynamics of polymer solutions: Flory-Huggins Theory. Glass transition temperature and molecular weight, factors influencing Glass transition temperature, determination of glass transition temperature, Numerical Problems	**15L**

RECOMMENDED BOOKS:
 	
    1. Biophysical Chemistry – J. P. Allen, Wiley-Blackwell, 2008.
    2. Biophysical Chemistry – A. Cooper, RSC, 2004.
    3. Thermodynamics of Biochemical Reactions– R.A. Alberty, Wiley-Interscience, 2003.	

4. Textbook of Biophysical Chemistry – U.N. Dash, McMillan India, 2006.

5. Physical Chemistry of macromolecules- D. D. Deshpande, Vishal Publications.

6. Polymer Chemistry- F. W. Billmeyer Jr, John-Wiley&Sons, 1971.

7. An Introduction to Electrochemistry by S. Glasstone

8. Modern Electrochemistry Vol. I &II by J. O. M. Bockris and A.K.N. Reddy.

9. Electrolytic Solutions by R. A. Robinson and R. H. Strokes, 1959

10. Electrochemistry- S. Glasstone, D. VanNostrand,1965

11. Photochemistry– J.G. Calverts and J.N. Pitts, John-Wiley&Sons

12. Fundamentals of Photochemistry- K. K. Rohatgi-Mukharjii, Wiley Eastern

13. Introduction to Photochemistry-Wells

14. Photochemistry of solutions-C.A. Parker, Elsevier

E-ACH103 Elective Paper: Analytical Chemistry-I [Credit 4, 60 L Hours]	
UNIT-I **Thermal Analysis Techniques** Introduction to thermal analysis, types of thermal analysis, significance of thermal analysis in Analytical Chemistry, effect of heat on materials, chemical decomposition, phase transformation etc. and general thermal analysis applications, advantages and disadvantages. a) Thermogravimetry analysis (TGA), principle, instrumentation, working, types of TGA, factors influencing TGA, curve to show nature of decomposition reactions, the product and qualities of compounds expelled, TGA in controlled atmosphere, TGA curves, analysis, research and analytical implications of TGA. Differential Thermogravimetric Analysis (DTG) and its significance. b) Differential thermal analysis (DTA) and differential scanning calorimetry (DSC), instrumentation, methodology, application and research implications. Thermometric titrations method and applications Problems: Simple problems based on TG, DTG, DTA and DSC.	**15 L**
UNIT-II **Atomic Spectroscopy** a) Atomic Absorption Spectroscopy Introduction, Principal, difference between AAS and FES, Advantages of AAS over FES, advantages and disadvantages of AAS, Instrumentation, Single and double beam AAS, detection limit and sensitivity, Interferences, applications. Graphite furnace atomic absorption spectroscopy, general description, advantages and	**15 L**

disadvantages. Flame photometry, Cold Vapour Mercury, Hydride Generation, Spark emission, challenges and limitations. b) Inductively Coupled Plasma Spectroscopy Introduction, Nebulisation Torch, Plasma, Instrumentation, Interferences, and Applications. Problems: Simple problems based on FES, AAS, GFAAS, ICP-AES, ICP-OES etc.	
UNIT-III **UV-Visible Spectroscopy** Ultraviolet and visible spectrophotometry (UV-Vis) Introduction, Beer Lambert's law, the magnitude of Molar absorptivities, instrumentation, Effect of solvents, Woodward-Fieser's rule, calculation of absorption maxima of dienes, dienones and polyenes, applications, Structural problems based on UV-Vis.	**15 L**
UNIT-IV **Infrared Spectroscopy** Infrared Spectroscopy (IR) Introduction, instrumentation, sampling technique, selection rules, types of bonds, absorption of common functional groups. Factors affecting frequencies, applications. Fourier Transform Infrared Spectroscopy: Instrumentation and applications. Attenuated Total Reflectance-Fourier Transform Infrared (ATR-FTIR) Spectroscopy: Instrumentation and applications. Universal Total reflectance-Fourier Transform Infrared (UTR-FTIR) Spectroscopy: Instrumentation and applications. **Problems:** Simple structural problems based on IR.	**15 L**
RECOMMENDED BOOKS 1. Instrumental Methods of analysis- Willard, Merrit, Dean and Settle. 2. Spectroscopic identification of organic compounds- R.M. Silverstein and G.C. Bassler 3. Spectroscopic methods in organic chemistry- D.H. Williams and I. Fleming 4. Absorption spectroscopy of organic molecules- V.M. Parikh 5. Applications of spectroscopic techniques in Organic chemistry- P. S. Kalsi 6. A Text book of Qualitative Inorganic Analysis- A. I. Vogel 7. Physical Methods in Inorganic Chemistry (DWAP)- R. Drago 8. Fundamentals of Analytical Chemistry – D.A. Skoog and D. M. West (Holt Rinehart and Winston Inc.) 9. Principles of instrumental analysis, Holler, Skoog, Crouch. Cengage learning India Pvt. Ltd. 10. Instrumental methods of chemical analysis, H. Kaur, PragatiPrakashan. 11. Fundametals of molecular spectroscopy-C.N. Banwell and E. M.McCash.	

PRCH104 Practical Paper-I [Credit 4, 120 Hours]	
Chemistry Major Practical Course	

A) Organic Chemistry Experiments
 	
Organic Preparations (Any Five):
 	
(One-stage preparations involving various types of reactions and confirmation of product by TLC)
 	
1. Coumarin Synthesis- 7-OH-4-methyl coumarin from Resorcinol and EAA.
 	
2. Knoevenagel condensation reaction-Reaction of aldehyde and malononitrile.
 	
3. Preparation of Hydantoin.
 	
4. Synthesis of triazoles- Reaction of aldehyde and thiosemicarbazide.
 	
5. Preparation of benzimidazole from OPD
 	
6. Preparation of Orange II
 	
7. Synthesis of dihydropyrimidone by Biginelli reaction
 	
8. Synthesis of Dibenzylidene acetone
 	
9. Preparation of Benzanilide from Benzophenone Oxime
 	
10. Benzoic acid and benzyl alcohol from benzaldehyde (Cannizarro reaction).
 	
11. Preparation of m-dinitrobenzene from nitrobenzene.
 	
    (Any suitable preparation may be added)
 	
B) Inorganic Section
 	
1) Ore Analysis
 	
        i) Determination of Silica and Manganese in Pyrolusite ore.
 	
        ii) Determination of iron from Haematite ore.
 	
2) Alloy Analysis
 	
        i) Determination of tin & lead from Solder alloy.
 	
        ii) Determination of copper and nickel from monel metal alloy.
 	
3)   Determination of concentration of phosphates in water samples colorimetrically.
 	
   Any other advanced experiments related to Inorganic Chemistry
 	
C) Physical Section
 	
  1) Chemical Kinetics: Kinetics of reaction between bromate and iodide.
 	
  2) Adsorption: Study of adsorption of acetic acid on charcoal.
 	
  3) Viscosity: Determination of molecular weight of polymers.
 	
  4) Refractometry:	

i) Determination of molecular radius of molecule of organic compound.

ii) Determination of concentration of sugar in unknown sample.

5) Polarimetry: Kinetics of inversion of cane sugar in presence of strong acid.

(New experiments may also be added)

D) Analytical Section

1. To verify Beer-Lambert's Law for potassium permanganate solution and hence to determine the molar extinction coefficient and unknown concentration of given sample Spectrophotometrically.

2. To determine the iron potentiometrically by titrating with potassium dichromate.

3. To determine the solubility of Calcium oxalate in presence of different concentration of KCl.

4. To determine the solubility of Calcium oxalate in presence of different concentration of HCl.

5. Analysis of pharmaceutical tablets for ibuprofen content.

6. To verify the Beer-Lamberts Law and determine the concentration of given organic dye solution colorimetrically/spectrophotometrically.

7. To estimate the amount of D-glucose in a given solution colorimetrically.

8. To determine the acid value of given oil.

PRCH105 Practical Paper-II   [Credit 2, 60 Hours]

Chemistry Minor Practical Course

A) Organic Section

Organic Estimations:(Any Three)

1. Estimation of Unsaturation.

2. Estimation of formalin.

3. Colorimetric Estimation of Dyes.

4. Estimation of Amino acids.

5. Estimation of Glycine.

Any suitable Expt. may be added.

B) Inorganic Section

Preparations and purity (Any four)

1. Potassimtrioxalatochromate(III)trihydrate

2. cis-potassiumdioxalatodiaquachromate(III)

3. Potassionhexathiocyanatochromate(III)

4. Bis(dimethylglyoximato)nickel(II)

5. Carbonatotetramminocobalt(III)nitrate

6. Hexamminocobaltic(III)chloride

C) Physical Section

1. Potentiometry:

    i) Determination of solubility and solubility product of silver halides.

    ii) Determination of binary mixture of weak and strong acid.

2. Conductometry:

    i) Determination of mixture of acids and relative strength of weak acids.

    ii) Determination of solubility of lead sulphate.

    iii) Determination of CMC and ΔG of sodium dodecyl sulphate.

3. pH-metry: Determination of dissociation constant of dibasic acid.

D) Analytical Section

1. Determination of standard deviation from the results obtained by redox titration of iron solution against standard potassium dichromate solution.

2. Determination of sodium from the fertilizer sample using cation exchange chromatography.

3. Determination of calcium from given drug sample.

4. Determination of hardness, alkalinity and salinity of water sample.

5. Separation and estimation of Cd^{2+} and Zn^{2+} by ion exchange chromatography for given Cd^{2+} and Zn^{2+} mixture. (Any other experiments may be added)

6. Application of excel spreadsheet for determination of Mean, median, standard deviation and graph plot.

RECOMMENDED BOOKS:

1. A Text Book of Practical Organic Chemistry- A. I. Vogel.

2. Practical Organic Chemistry- Mann and Saunders.

3. A Handbook of Quantitative and Qualitative Analysis- H. T. Clarke.

4. Organic Synthesis Collective Volumes by Blat.

5. Practical Med. Chem..-Dr. K. N. Jayveera, Dr. S. Subramanyam, Dr. K. Yogananda Reddy

6. A text book of Quantitative Inorganic Analysis– A. I. Vogel

7. Experimental Inorganic Chemistry -W. G. Palmer

8. The analysis of minerals and ores of the rarer elements–W.R. Schoeller and A. R. Powell, Charles, Griffin and Company Limited.

9. Experimental Inorganic / Physical Chemistry–M. A. Malti, Horwood Series in Chemical Science, Horwood Publishing Chinchster.

10. Instrumental Methods of analysis- Willard, Merrit, Dean and Settle.

11. A Text book of Qualitative Inorganic Analysis- A. I. Vogel

12. Physical Methods in Inorganic Chemistry (DWAP)- R. Drago

13. Fundamentals of Analytical Chemistry – D.A. Skoog and D. M. West (Holt Rinehart and Winston Inc.)

RM-CH106 Research Methodology [Credit 4, 60 L Hours]	
UNIT-I **A) Introduction to Research Methodology** Objective of research, motivation in research, Introduction to research methodology, design and implementation of research methods, types of research, Fundamental research, applied research, experimental research, and interdisciplinary research, the research process, formulating, reviewing the literature. **B) Scope of Research and Ethics:** Scientific methods of research, criteria of good research, and characteristics of a good research, Research problem: Identification, Selection, developing research title, Criteria for prioritizing topics for research, Prioritizing Topics for Research, Formulation of research objectives. Types and importance of research ethics, Institutional ethics committee, Plagiarism, Patenting and intellectual property rights. Publication ethics: definition, introduction, and importance.	**15 L**
UNIT-II Literature Search and Techniques Literature review, Sources of information: Primary, secondary, tertiary sources; Journals: Journal abbreviations, abstracts, current titles, reviews, monographs, dictionaries, Introduction to Chemical Abstracts and Beilstein, Subject Index, Substance Index, Author Index, and Formula Index.	**15 L**

Literature Search technique: SCOPUS, Google Scholar, PUBMED, Web of Science, science direct, Indian Citation Index, Research Gate, and scifinder, Scirus, ChemIndustry, Wiki-Databases, ChemSpider. Overview of the journal article: Selection of journals, Data bases and research metrics Databases: i) indexing databases ii) Citation databases: Web of Science, Scopus, UGC-Care List etc. Research Metrics: a) Impact Factor of journal as per Journal Citation Report, SNIP, SJR, IPP, Cite Score b) Metrics: h-index, g index, i10 index. Citation Index, Impact Factor	
UNIT-III Scientific report writing Publication Process: Types of technical documents- Full length research paper, Short/Brief communications, Letters to editor, Book chapter, Review, Conference report, Patents, dissertation. Components of a research publication/proposal: Title/Topic statement, Abstract/key words, Aims and objectives, Hypothesis building, Rationale of the paper, Work plan, Materials and methodology, Results and discussion, mechanism, Key issues, and arguments, Acknowledgement, Conflict of interest statement, bibliography, Technical Resumes & Cover Letters. Softwares in Chemistry: Data Plotting, Structure Drawing, Grammar Checkers and Sentence Correction Tools. Use of bibliography tools (Endnote/Zotero/Mendeley).	**15 L**
Unit IV **A) Quantitative Techniques** Classification of quantitative methods, General steps required for quantitative analysis, reliability of the data, classification of errors, accuracy, precision, statistical treatment of random errors, the standard deviation of complete results, error proportion in arithmetic calculations, Uncertainty and its use in representing significant digits of results, confidence limits, Estimation of detection limit. **B) Computer Applications: Presentation and Communication skills** The students will learn how to operate a PC and how to run standard programs, software and packages. Execution of linear regression, X-Y plot, numerical integration, and differential as well as differential equation solution programming, Chemo metrics – Computer-based laboratory, instrumental data interpretation, statistical data interpretation Conference presentation, preparation of effective slides and presentation. Tables, Figures and Pictures using Excel, PowerPoint slide preparation, Preparation of Posters, Electronic submission of manuscripts, oral and poster, Communication skills.	**15 L**

References:

1) Fundamentals of Analytical Chemistry by D. A. Skoog, D. M. West, and F. J. Hooler.

2) Quality in the Analytical Chemistry Laboratory by R. D. Treble and D. G. Holcombe.

3) Molecular dynamics simulations elementary methods by J. M. Haile.

4) The art of molecular dynamics simulations by D. C. Rapaport.

5) Introduction to computational chemistry by F. Jensen.

6) Molecular modeling principles and applications by A. R. Leach.

7) Computer Education by Prof. Lalini Varanasi, Prof. V. Sudhakar, and Dr. T. Mrunalini, Neelkamal Publications PVT. LTD.

8) Basic Computing Principles by B. West, BPB Publications, New Delhi 1992

9) Essentials of computational chemistry by C. J. Cramer.

10) Practical Research Methods, Catherine Dawson, UBS Publishers Distribution, New Delhi 2002.

11) Research Methodology – Methods and Techniques, C. R. Kothari, Wiley Easter Ltd, New Delhi 1985. 12) Research Methodology – A Step by step Guide for Beginners 2nd edn. Kumar Ranjit, Pearson Education, Singapore, 2005.

13) Introduction to Research and Research Methodology M. S. Sridhar.

14) The Information Specialist's Guide to Searching & Researching on the Internet & the World Wide Web by Ernest Ackermann, Karen Hartman, Fitzroy Dearborn Publishers, London.

15) Learning to Use the World Wide Web, Ernest Ackermann, BPB Publications

M. Sc. Part – I (Semester – II)

PCH201: Physical Chemistry-II [Credit 4, 60 L Hours]	
UNIT-I **QUANTUM CHEMISTRY** Introduction: Wave particle duality of material and DeBroglie's hypothesis, uncertainty principle, Schrodinger equation, wave function, conditions for acceptable wave functions and its interpretation, properties of wavefunctions, Operators and related theorems, algebra of operators, commutator, linear operators, Normalization and orthogonality, Eigenfunctions and Eigenvalues, postulate of quantum mechanics. Solutions of wave equation for a free particle and particle in a box problem, Transition dipole moment integral and selection rules,	**15 L**

particle in a box application to electronic spectra of conjugated linear organic molecules. Linear and angular momentum operators, eigen function and eigen values of angular momentum operator, Ladder operator, addition of angular momenta. Spin angular momenta, symmetric and antisymmetric wavefunctions, Pauli Exclusion Principle, spectroscopic term symbols. Numerical problems

UNIT-II **STATISTICAL THERMODYNAMICS** Probability and distribution, Stirling's Approximation, Weights and configurations, the most probable configuration, Ensembles, ensemble average and time average of property. Statistical equilibrium, thermodynamic probability, Maxwell-Boltzmann (MB) distribution law. Partition function and its significance. Rotational, translational, vibrational and electronic partition functions. Relationship between partition function and thermodynamic properties, thermodynamic probability and entropy: Boltzmann – Planck equation and third law of thermodynamics, Application to monoatomic gases – Sackur-Tetrode equation, applications to diatomic molecules, Statistical expression for equilibrium constant, Limitations of Maxwell-Boltzmann statistics, Numerical Problems.	**15 L**
Unit-III **ELECTROCHEMISTRY** Activity and Activity coefficients: forms of activity coefficients and their interrelationship, Types of electrodes, Determination of activity coefficients of an electrolyte using concentration cells, instability constant of silver ammonia complex Electrokinetic phenomena: Electrical double lever, theories of double layer-Helmholtz-Perrin theory, Gouy and Chapman theory, Stern theory. electro-capillary phenomena, electro-capillary curve. Electro-osmosis, electrophoreses. Streaming and Sedimentation potentials. Zeta potentials and its determination by electrophoresis, influence of ions on Zeta potential.	**15 L**
UNIT-IV **CHEMICAL KINETICS** Introduction to basic concepts, Experimental methods of following kinetics of a reaction, chemical and physical (measurement of pressure, volume, EMF, conductance, diffusion current and absorbance) methods and examples. Steady state approximation and study of reaction between NO_2 and F_2, decomposition of ozone, and nitrogen pentoxide. Ionic	**15L**

reaction: Primary and secondary salt effect, Catalysis: Classification of catalysis, mathematical expression of autocatalytic reactions, Michaelis–Menten enzyme catalysis, Homogeneous catalysis: acid and base catalyzed reactions, Heterogeneous catalysis: Adsorption of gas on a surface and its kinetics, Catalyzed hydrogen-deuterium exchange reaction.

RECOMMONDED BOOKS:

1. IntroductoryQuantumChemistry-A. K. Chandra.TataMcGraw-Hill.1988.
2. Physical Chemistry: A molecular Approach Donald A. McQuarrie and John D. Simon, Viva Books, New Delhi, 1998.
3. Quantum Chemistry–Donald A. McQuarrie, Viva Books, NewDelhi,2003.
4. Quantum Chemistry-W. Kauzmann, Academic press.
5. Theoretical Chemistry: An introduction to quantum mechanics, statistical mechanics, and molecular spectra for chemists-S. Glasstone, D. Van Nostrand Company, Inc.,1944.
6. Quantum Chemistry-R.K. Prasad, New Age International, NewDelhi.
7. Physical Chemistry–R.S. Berry, S.A. Rice, J. Ross, 2ndEd., Oxford University Press, NewYork, 2000.
8. Physical Chemistry–P.W.Atkins, Oxford Universitypress, 8thedition, 2006.
9. Text book of Physical Chemistry– S.Glasstone.
10. Principles of Physical Chemistry– Marron and Pruton.
11. Physical Chemistry–G.M.Barrow, Tata-McGraw Hill, Vth edition,2003.
12. Thermodynamics for Chemists –S. Glasstone, D. Van Nostrand, 1965.
13. Elements of statistical thermodynamics- L. K. Nash, 2nd Ed. Addison Wesley 1974.
14. Theoretical Chemistry: An introduction to quantum mechanics, statistical mechanics, and molecular spectra for chemists - S. Glasstone, D. Van Nostrand Company, Inc.,1944.
15. An Introduction to Statistical Thermodynamics–T.L. Hill, Addison-Wesley. 1960
16. Statistical Mechanics–DonaldA.McQuarrie,2000.
17. An Introduction to Electrochemistry by S. Glasstone
18. Modern Electrochemistry Vol.I & II by J.O.M. Bockris and A.K.N. Reddy.
19. Electrolytic Solutions by R. A. Robinson and R. H. Strokes, 1959
20. Chemical Kinetics-K. J. Laidler, Pearson Education,2004
21. Kinetics and Mechanism-A. A. Frostand R. G. Pearson.
22. Electrochemistry- S. Glasstone, D. VanNostrand,1965

23. Advanced Physical Chemistry-Gurdeep Raj, Goel Publishing House

24. Basic chemical Kinetics-G.L. Agarwal, Tata-McGraw Hill

25. Physical Chemistry– G.M. Barrow, Tata-McGraw Hill, Vth edition,2003.

ACH202: Analytical Chemistry-II [Credit 4, 60 L Hours]	
UNIT-I **Basics of Analytical Chemistry and Indian Knowledge System (IKS)** **Basics of Analysis:** Chemical analysis, instrumental methods, Analytical methods, Techniques of analysis, classification of analytical techniques, Classification of instrumental methods, factors affecting choice of analytical methods, interferences. **Statistical analysis:** Types and sources of error, determinate and indeterminate errors, accuracy and precision Absolute and relative errors, Minimization of errors, Significantfigures, Mean, median and standard deviation, Least square method. **MS Office in Chemistry applications:** Excel Spreadsheet, Introduction to excel and its applications for computation and graph plotting, calculations using formulas for summation, mean, standard deviation. MS-Word for Chemical Documentation, MS PowerPoint for Virtual Chemical Animations. Numerical Problems. **Indian Knowledge System (IKS) and Chemistry:** Introduction, concept, Historical background, stone age, iron age, bronze age, metallurgy, alloys and Indian perspectives	**15 L**
UNIT-II **Fundamentals of Quantitative Analysis** **Volumetric Analysis:** Introduction, general terms in volumetric analysis, indicators, indicator theory, choice of indicators. Acid-base titrations, titration curves with example, Buffer solutions, acid-base equilibrium in- polyprotic acids, amino acids, carbonates, bicarbonates, mixture of two acids. Complexometric titrations-stability of complexes, metal-ion buffer, titrations involving unidentate and multidentate ligands. Precipitation titrations and solubility equilibria, indicators, factors affecting solubility, applications of precipitation titrations. Oxidation-reduction equilibria and applications, Nernst equation, titration curves, redox indicators, applications with respect to $KMnO_4$, $K_2Cr_2O_7$, Iodine, and Potassium bromate. **Gravimetric Analysis:** Introduction, general terms used in gravimetry, steps in gravimetric analysis, conditions for precipitation, purity of the precipitate – Co-precipitation and Post-precipitation, precipitation from homogenous solution, organic precipitants. Advantages and disadvantages of gravimetric analysis. Determination of iron gravimetrically form iron ore,	**15 L**

determination of lead gravimetrically from Galena ore, determination of Pb gravimetrically from type metal alloy. Problems.	
UNIT-III **Chromatographic methods of separation** General principle, classification of chromatographic methods, migration rates of solutes, chromatographic behavior of solutes, band broadening, terms in chromatography, plate theory, column efficiency and resolution. Introduction to paper, TLC and column chromatography. **Gas Chromatography:** Basic Principle, Instrumentation, detectors, Applications, Advantages and disadvantages. **HPLC:** Basic Principle, Instrumentation, detectors, applications, advantage and disadvantages. **Ion exchange chromatography:** Introduction and basic principles, instrumentation, types of exchangers, synthesis of ion exchangers, mechanism of ion exchange, exchange theories, methodology, applications. Problems.	**15 L**
UNIT-IV **Electro Analytical Techniques** **a) Voltammetry:** Voltammetric methods of analysis, voltametric techniques, current in voltammetry, shape of voltammograms **Polarography:** Introduction, Instrumentation, Ilkovic equation and its verification. Polarographic measurements, Dropping mercury electrode, Determination of half wave potential, qualitative and quantitative applications. **Amperometry:** Basic principles, instrumentation, Amperometric titration curves, Amperometric indicators, procedure for Amperometric titrations, Evaluation of amperometry in research and analytical applications **b) Electrogravimetry:** Introduction, Types of electrogravimetric techniques, Diffusion Migration, Convection, instrumentations, applications.	**15 L**
RECOMMENDED BOOKS: 1. Instrumental Methods of analysis- Willard, Merrit, Dean and Settle. 2. Spectroscopic identification of organic compounds- R.M. Silverstein and G.C. Bassler 3. Spectroscopic methods in organic chemistry- D.H. Williams and I. Fleming 4. Absorption spectroscopy of organic molecules- V.M. Parikh 5. Applications of spectroscopic techniques in Organic chemistry- P. S. Kalsi	

6. A Text book of Qualitative Inorganic Analysis- A. I. Vogel

7. Physical Methods in Inorganic Chemistry (DWAP)- R. Drago

8. Fundamentals of Analytical Chemistry – D.A. Skoog and D. M. West (Holt Rinehart and Winston Inc.)

9. Principles of instrumental analysis, Holler, Skoog, Crouch. Cengage learning India Pvt. Ltd.

10. Instrumental methods of chemical analysis, H. Kaur, PragatiPrakashan.

11. Fundametals of molecular spectroscopy-C.N. Banwell and E. M.McCash.

E-OCH203 Elective Paper: Organic Chemistry-III　　　[Credit 4, 60 L Hours]	
UNIT-I **Organic Photochemistry** Effect of light intensity on the rate of photochemical reactions. Types of photochemical reactions, photochemistry of alkynes, intramolecular reactions of the olefinic bonds, geometrical isomerism, cyclization reactions, rearrangements of 1,4 and 1,5-dienes, photochemistry of carbonyl compounds, intramolecular reactions of carbonyl compounds saturated cyclic and acyclic α, β-unsaturated compounds, cyclohexadienones, intermolecular cycloaddition reactions, dimerization and oxetane formation, photochemistry of aromatic compounds, photo fries reactions of anilides, photo fries rearrangements. Singlet molecular oxygen reactions.	**15 L**
UNIT-II **A) Hydroboration [5L]** Various hydro borating agents their mechanism and synthetic applications of 9-borabicyclo-[3.3.1]nonane (9-BBN), thexylborane, and diisoamylborane. (Sia_2BH), $BH_3 \cdot SMe_2$. (BMS). **B) Enamines [4L]** The formation, reactivity and synthetic applications of enamines **C) Protection of Functional Groups [6L]** Principle of protection of alcohol, amine, carbonyl and carboxyl groups	**15 L**
UNIT-III: **A) Study of Organometallic Compounds [07L]** Organo-lithium, Use of lithium dialkylcuprate, their addition to carbonyl and unsaturated carbonyl compounds, Allylic organometallics of boron, silicon and tin **B) Methodologies in Organic Synthesis [08L]**	**15 L**

Ideas of synthones and retrones, Functional group transformations and inter-conversions of simple functionalities.	
UNIT-IV **Reagents in Organic Synthesis** Tebbe reagent, Baker's yeast, Lawessons reagent, Diazomethane. Dimethyl dioxirane. Korn-Blum oxidation, Moffatt Oxidation Doring Parikh, Goldmann, Ag_2CO_3 on celite. TPAP, IBX, Dess-Martin oxidation	**15 L**
RECOMMENDED BOOKS: 1. Modern Synthetic Reactions-(Benjamin) H. O. House. 2. Reagents in Organic Synthesis-(John Wiley) Fieser and Fieser 3. Principles of Organic Synthesis-(Methuen) R. O. C. Norman 4. Hydroboration- S. C. Brown. 5. Advances in Organometallic Chemistry- (A.P.)F. C. A. Stone and R. West. 6. Organic Chemistry (Longman)Vol. I & Vol. II- Finar 7. Oxidation by-(Marcel Dekker) Augustin 8. Advanced Organic Chemistry 2nd Ed. R R. Carey and R. J. Sundburg 9. Organic Synthesis-(Prentice Hall)R. E. Ireland. 10. Homogeneous Hydrogenation-(J. K.) B. R. James. 11. Comprehensive Organic Chemistry- (Pargamon) Barton and Ollis. 12. Organic Reactions - R. Adams. 13. Some Modern Methods of Organic Synthesis-(Cambridge) W. Carruthares. 14. Organic Chemistry- Jonathan Clayden	
E-ICH203 Elective Paper: Inorganic Chemistry-III [Credit 4, 60 L Hours]	
UNIT-I **Chemistry of Non-transition Elements and their compounds** Periodic properties of the non–transition elements, Polymorphism in carbon, phosphorous and sulphur, Synthesis, properties and structure of boranes, carboranes, silicates, carbides, phosphazenes, sulphur–nitrogen compounds, peroxo compounds of boron, carbon, sulphur, Structure and bonding in oxy acids of nitrogen, phosphorous, sulphur and halogens, interhalogens, psudohalides	**15 L**
UNIT-II	**15 L**

Stereochemistry and bonding in Main group compounds Hybridization and structure of molecules, VSEPR Theory (Postulates and Applications), t y p e of pi-bonding (pπ-pπ and pπ-dπ) and its consequences, Bent rule, Walsh Diagram, Some simple reactions of covalently bonded molecules (Atomic inversion, Berry Pseudo rotation, Nucleophilic displacement, Free radical reaction).	
UNIT-III **Chemistry of f-block elements (Lanthanides and Actinides)** Occurrence, properties of the f-block elements, colour, oxidation state, Spectral and magnetic properties of lanthanides and actinides, lanthanide contraction, Use of lanthanide compounds as shift reagents, compounds of lanthanides, Photoluminescence properties of lanthanide compounds, Modern methods of separation of lanthanides and actinides, Applications of lanthanide and actinide compounds in Industries.	**15 L**
UNIT-IV **Stability of Metal complexes** Thermodynamic vs. kinetic stability, Stability constant, Stepwise and overall stability constants with their relation, Trends in stepwise stability constant, Factors affecting the stability of metal complexes with reference to the nature of metal ion and ligand, Chelate effect, Ternary complexes and factors affecting their stabilities, Stability of metal complexes of crown ethers, Determination of stability constants by spectrophotometric methods (Job's and Mole/slope ratio for composition), Bjerrum' spHmetric method.	**15 L**
RECOMMONDED BOOKS: 1. A. F. Wells, Structural Inorganic Chemistry– 5thedition (1984) 2. J. H. Huheey, Inorganic Chemistry Principles, structure and reactivity, Harper and Row Publisher, Inc. NewYork (1972) 3. J. D .Lee, Concise inorganic Chemistry, Elbs with Chapmanand Hall, London 4. M.C. Dayand J. Selbin, Theoretical Inorganic Chemistry, Reinhold, EWAP 5. Jones, Elementary coordination Chemistry 6. Martell, Coordination Chemistry 7. T. S. Swainand D. S.T. Black, organometallic Chemistry 8. John Wulff, structure and properties of materials, vol 4, electronic properties, WileyEastern 9. L. V. Azoroff, J. J. Brophy, Electronic processes in materials, McCraw Hill 10.F.A. Cotton, R. G. Wilkinson. Advanced Inorganic chemistry	

11. Willam L. Jooly ,Modern Inorganic Chemistry

12. Manas Chanda, Atomic Structure and Chemical bonding

13. P. L. Pauson, Organometallic Chemistry

14. H. S. Sisler,Chemistry in non–aqueous solvents, Reinhold Publishing Corporation, USA, 4th edition (1965)

15. H. J. Arnikar, Essentials of Nuclear Chemistry

16. Friedlander, Kennedy and Miller, Nuclear and Radiochemistry.

17. Fundamental Concepts of Inorganic Chemistry (Vol I to VII),A. K. Dasand M. Das, CBS Publishers.

18. Inorganic Chemistry, P. Atkins, T. Overtone, J.Rourke, M. Weller, F. Armstrong, 5th Eds.,Oxoford University Press.

19. Inorganic Chemistry, H. E. House, Elsevier Publishers.

E-PCH203 Elective Paper: Physical Chemistry-III   [Credit 4, 60 L Hours]

UNIT-I **THERMODYNAMICS** Introduction, revision of basic concepts: Entropy and third law of thermodynamics. Methods of determining the practical absolute entropies. Entropies of phase transition. Maxwell relations and its applications, thermodynamic equation of state. Ideal and non-ideal solutions, Thermodynamics of nonelectrolyte solutions. Raoult's law. Duhem-Margules equation and its applications to vapor pressure curves (Binary liquid mixture).Gibbs-Duhem equation and its applications to study of partial molar quantities. Chemical potential, variation of chemical potential with temperature & pressure. Henry's law. Excess and mixing thermodynamic properties. Equilibrium constants and general conditions of equilibrium in terms of thermodynamic potentials. Numerical Problems.	**15L**
UNIT-II **SURFACE PHENOMENA** Adsorption, adsorption isotherms, surface area determination, Gibbs adsorption equation and its verification, Surface tension, electrical phenomena at interfaces including electrokinetic effects, micelles, reverse micelles, solubilization. Thermodynamics of micellisation, factors affecting critical micelle concentration (cmc), experimental methods of cmc determination. Application of photoelectron spectroscopy, ESCA and Auger spectroscopy to the study of surfaces. Significance of surface phenomena in advanced technologies like nanotechnology, drug formulation etc.	**15L**

UNIT-III	**15 L**
KINETIC THEORY OF GASSES	
1. Postulates of kinetic theory of gases, P-V-T relations for an ideal gas, non-ideal behavior of gases, equation of state, compressibility factor, virial equation, van der Waal's equation, excluded volume and molecular diameter, relations of van der Waal's constants with virial coefficients and Boyle temperature.	
2. Molecular statistics, distribution of molecular states, deviations of Boltzmann law for molecular distribution, translational partition function, Maxwell Boltzmann law for distribution of molecular velocities, physical significance of the distribution law, deviation of expressions for average, root mean square and most probable velocities, experimental verification of the distribution law.	
3. Molecular collision in gases, mean free path, collision diameter and collision number in a gas and in a mixture of gases, kinetic theory of viscosity and diffusion.	
Numerical Problems	
Unit IV	**15 L**
COLLOIDS	
Colloids: Colloidal solution, classification of colloids, Lyophobic and Lyophilic Colloids, Properties of colloids,	
Sol: Preparation, Theories of origin of charge on sol particles, Determination of charge on a colloidal particle, Stability of sols, Association colloids, Spontaneous ageing of colloids, Factors affecting the spontaneous ageing, theories of spontaneous ageing, coagulation, kinetics of coagulation.	
Emulsion: Types of emulsion, preparation, properties, Characteristics, Identification test between two types of emulsions, microemulsion, reverse microemulsion, emulsifiers, demulsification.	
Gels: classification, methods for the preparation of gels, properties of gels, Applications of colloid science.	
RECOMMENDED BOOKS:	
1. Physical Chemistry–P. W. Atkins, Oxford Universitypress,8thedition,2006.	
2. Text book of Physical Chemistry– S. Glasstone.	
3. Principles of Physical Chemistry– Marron and Pruton.	
4. Physical Chemistry–G. M .Barrow,Tata-McGrawHill,Vthedition,2003.	
5. Advanced Physical Chemistry-Gurdeep Raj, Goel Publishing House	

6. Physical chemistry of surfaces –A. W. Adamson, 4thEd. JohnWiley,1982

7. Introduction to Colloid and Surface Chemistry-D. J. Shaw, Butter worth Heinemann,1992.

8. Surface Activity: Principles, Phenomena and Applications (Polymers, Interfaces and Biomaterials)–K.Tsujii,1stEd.Academic Press,1998.

9. Thermodynamics for Chemists- S. Glassstone, 1965

10. Thermodynamics: A core course- R. C. Shrivastava, S. K. Saha and A. K. Jain 2004

E-ACH203 Elective Paper: Analytical Chemistry-III [Credit 4, 60 L Hours]	
UNIT-I **Structural Spectroscopic techniques** Nuclear Magnetic Resonance (NMR) Magnetic and non-magnetic nuclei, Larmor frequency, absorption of radio frequency. Instrumentation (FT-NMR). Sample preparation, chemical shift, anisotropic effect, spin spin coupling, coupling constant, applications to simple structural problems.	**15 L**
UNIT-II **Mass spectrometry (MS)** Basic principle, working of mass spectrometer, ionization, types of ionization and classification of MS based on ionization, analyzers (magnetic sector, quadrupole, ion-trap, time of flight, formation of different types of ions, Mclafferty rearrangements, fragmentation of alkanes, alkyl aromatics, alcohols and ketones, simple applications. **Problems: Simple structural problems based on IR, UV, NMR and MS**	**15 L**
UNIT III **Microwave Spectroscopy** Rotation of Molecules, Rigid and Non-rigid Rotors; Quantum Aspects of Molecular Rotational Energy and Selection Rules of Transitions; Diatomic and Polyatomic Molecules, Techniques and Instrumentation; Applications of Microwave Spectroscopy. Numerical problems	**15 L**
UNIT IV **Raman Spectroscopy** Introduction, Pure rotational Raman Spectra, Vibrational Raman Spectra, Polarization of light from Raman and Infra-red spectroscopy, Techniques and Instrumentation, Near Infra-red FT-Raman Spectroscopy. Hyphenated Raman techniques. Numerical problems	**15 L**
RECOMMENDED BOOKS:	

1. Instrumental Methods of analysis- Willard, Merrit, Dean and Settle.

2. Spectroscopic identification of organic compounds- R.M. Silverstein and G.C. Bassler

3. Spectroscopic methods in organic chemistry- D.H. Williams and I. Fleming

4. Absorption spectroscopy of organic molecules- V.M. Parikh

5. Applications of spectroscopic techniques in Organic chemistry- P. S. Kalsi

6. A Text book of Qualitative Inorganic Analysis- A. I. Vogel

7. Physical Methods in Inorganic Chemistry (DWAP)- R. Drago

8. Fundamentals of Analytical Chemistry – D.A. Skoog and D. M. West (Holt Rinehart and Winston Inc.)

9. Principles of instrumental analysis, Holler, Skoog, Crouch. Cengage learning India Pvt. Ltd.

10. Instrumental methods of chemical analysis, H. Kaur, PragatiPrakashan.

11. Fundametals of molecular spectroscopy-C.N. Banwell and E. M.McCash.

PR-CH204 Practical Paper-III   [Credit 4, 120 Hours]

Chemistry Major Practical Course

A) Organic Section

Qualitative Analysis: **Separation of Binary Mixture by Micro analytical Technique**

Separation of binary mixture using physical and chemical methods. Identification of individual compounds and checking its purity by TLC. Preparation of the derivative of one of the compounds. The following types are expected: (i) Solid-Solid (ii) Non-volatile liquid- Non-volatile liquid (iii) Water-soluble/insoluble solid-Non-volatile liquid with compounds from the same or different chemical classes in all three categories.

The candidate is expected to carry out separation of at least **03** mixtures.

B) Inorganic Section

1) Ore Analysis

  i) Determination of calcium and magnesium from Dolomite ore.

  ii) Determination of copper and iron from Chalcopyrite ore.

2) Alloy Analysis

  i) Determination of copper and zinc from brass alloy.

  ii) Determination of iron & chromium from steel alloy.

3) SeparationofFe^{2+} Cu^{2+} Ni^{2+} by anion exchange.

C) Physical Section

1) Refractometry**:**

      i) Determination of atomic refractions of H, C and Cl atoms.

      ii) Determination of composition of mixture of liquids.

2) Cryoscopy: Determination of apparent weight and degree of dissociation a strong

   electrolyte

3) Chemical kinetics**:** Kinetics of iodination of acetone in presence of strong acid

4) Phase Equilibrium: To construct phase diagrams for ternary system.

5) Viscosity**:** Determination of radius of sucrose molecules.

(New experiments may also be added)

D) Analytical Section

1. To estimate the amount of NH_4Cl colorimetrically using Nesseler's Reagent.

2. To determine the solubility of PbI_2 in presence of different concentration of KNO_3

3. To determine the solubility of PbI_2 in presence of different concentration of KCl

4. Potentiometric estimation of bleaching powder.

5. Determination of capacity of cation exchanger

6. Determination of capacity of anion exchanger

7. Determination of turbidity of water sample using nephalometer

8. To determine the iron content from soap sample

PR-CH205 Practical Paper-IV [Credits 02, 60 hours]

Chemistry Minor Practical Course

A) Organic Section

Organic Estimations (Any Three):

1. Determination of percentage of Keto-enol form.

2. Estimation of Ibuprofen.

3. Estimation of Aspirin.

4. Estimation of the Acid value of an oil.

5. Estimation of Caffeine.

   Any other suitable experiments may be added.

B) Inorganic Section

Preparations and purity (Any four)

1) Tris (acetylacetonato)cobalt(III)trihydrate
2) Penta-aquachloro chromium(III)chloride
3) Hexathioureaplumbus(II)nitrate
4) Bis (acetylacetonato) copper(II)
5) Diaquabis(ethylediammine) copper(II)iodide
6) Copper ferrite

C] Physical Section

1) Potentiometry:
   i. Determination of formal redox potential of system (Fe^{2+}, Fe^{3+})
   ii. Determination of binary mixture of halides.
   iii. Determination of dissociation constant of acetic acid.

2) Conductometry:
   i. Titration of ternary acid mixture of acids.
   ii. Verification of Onsagar Equation for1:1 type of strong electrolyte.
   iii. Determination of ΔG, ΔH, ΔS of silver benzoate by solubility product method.

D] Analytical Section

1. Determination of sulphate by nephalometry/tubidimetry
2. Determination of isoniazid from pharmaceutical tablet
3. Determination of caffeine from tea powder
4. Determination of iron from iron tablet samples
5. Estimation of fatty acid from soap sample

RECOMMENDED BOOKS:

1. Instrumental Methods of analysis- Willard, Merrit, Dean and Settle.
2. Spectroscopic identification of organic compounds- R.M. Silverstein and G.C. Bassler
3. Spectroscopic methods in organic chemistry- D.H. Williams and I. Fleming
4. Absorption spectroscopy of organic molecules- V.M. Parikh
5. Applications of spectroscopic techniques in Organic chemistry- P. S. Kalsi
6. A Text book of Qualitative Inorganic Analysis- A. I. Vogel
7. Physical Methods in Inorganic Chemistry (DWAP)- R. Drago

8. Fundamentals of Analytical Chemistry – D.A. Skoog and D. M. West (Holt Rinehart and Winston Inc.) 9. Principles of instrumental analysis, Holler, Skoog, Crouch. Cengage learning India Pvt. Ltd. 10. Fundametals of molecular spectroscopy-C.N. Banwell and E. M. McCash. 11. A textbook of Quantitative Inorganic Analysis– A. I. Vogel 12. Experimental Inorganic Chemistry-W. G. Palmer 13. The analysis of minerals and ores of the rarer elements– W. R. Schoeller 14. A. R. Powell, Charles, Griffin and Company Limited 15. A text book of Quantitative Inorganic Analysis– A. I. Vogel 16. Practical Organic Chemistry- Mann and Saunders. 17. A Handbook of Quantitative and Qualitative Analysis- H. T. Clarke. 18. Organic Synthesis Collective Volumes by Blat.	

To be implemented from July 2023 onwards Semester I & II

Nature of Question paper

Total Marks 80

Instructions: 1) Attempt in all five questions.
2) Question No. 1 is compulsory.
3) Attempt any two questions from Section-I and any two questions from Section-II.
4) All questions carry equal marks. Figures to right indicate marks.

Q.1 Solve the Following (Compulsory1 Mark each)   16 Marks

a)
.
.To
.
p)

Section I

Q.2.   Two sub questions (8 marks each) or Three sub question (6+6+4 marks) = 16 Marks

Q.3.   Two sub questions (8 marks each) or Three sub question (6+6+4 marks) = 16 Marks

Q. 4   Two sub questions (8 marks each) or Three sub question (6+6+4 marks) = 16 Marks

Section II

Q.5.   Two sub questions (8 marks each) or Three sub question (6+6+4 marks) = 16 Marks

Q.6.   Two sub questions (8 marks each) or Three sub question (6+6+4 marks) = 16 Marks

Q.7. Writes notes on **any four** of the following (Out of Six)   16 Marks
   a)
   .
   .To
   .
   e)

M.Sc. I Syllabus (NEP-2020)
To be implemented from July 2023 onwards
Nature of Practical Examination

Semester I

Practical Paper I and II (100+50) = 150 marks

Semester II

Practical Paper III and IV(100+50)= 150 marks

Number of Examination Days = 03