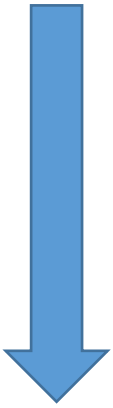
1.3.1: Institution integrates cross-cutting issues relevant to Gender, Environment and Sustainability, Human Values and Professional Ethics into the Curriculum.



पुणे विद्यापीठ

एफ.वाय.बी.ए

आणि

एफ.वाय.बी.कॉम

मराठी विषय

पुनर्रचित अभ्यासक्रम

शैक्षणिक वर्ष

जून 2013 पासून पुढे

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पुणे विद्यापीठ

विषय : मराठी - पुनर्रचित अभ्यासक्रम , जून २०१३ पासून पुढे

प्रथम वर्ष कला - सामान्यस्तर अभ्यासपत्रिका क्रमांक - १ (1024)

- अभ्यासक्रमाची उद्दिष्टे-

१ सामान्य स्तर बी. ए. १, २ आणि ३ पर्यंतच्या सामान्य स्तरावरील मराठी या विषयाचा अभ्यास करणा-या विद्यार्थ्यास स्थूलपणे मराठी साहित्य, मराठी भाषा आणि मराठी संस्कृती यांचा क्रमश: परिचय करून देणे.

२ साहित्यासंबंधी - विशेषत: मराठी साहित्यासंबंधी रुची निर्माण करणे.

३ विद्यार्थ्याच्या वाङ्.मयीन अभिरुचीचा विकास करणे.

४ आस्वाद घेण्याची डोळस क्षमता विकसित करणे.

५ साहित्याभ्यासातून जीवनविषयक समज विकसित करणे.

६ मराठी साहित्यातील भिन्न भिन्न प्रवाह आणि प्रकार लक्षात घेणे.

७ जागतिकीकरणात विविध क्षेत्रांना सामोरे जाण्यासाठी भाषिक क्षमता विकसित करणे.

८ व्यक्तिमत्त्व विकासात भाषेचे महत्त्व स्पष्ट करणे.

♦♦♦♦♦

- सत्र पहिले

कथासंग्रह/कादंबरी/नाटक/ललितगद्य यापैकी एक पुस्तक आणि उपयोजित मराठी ६० गुण

घटक १ - नेमलेला कथासंग्रह

'मराठी विनोदी कथा ' - संपादक डॉ. द. ता. भोसले ४० गुण

घटक-२ - व्यावहारिक आणि उपयोजित मराठी

अ - व्यक्तिमत्त्व विकास आणि भाषा, ०४ गुण
व्यक्तिमत्त्व विकासात भाषेचे स्थान

ब - भाषिक कौशल्ये- श्रवण कौशल्य, संभाषण कौशल्य वाचन कौशल्य, भाषण कौशल्य, लेखन कौशल्य — ०८ गुण

क - कार्यक्रम संयोजन कौशल्ये- — ०८ गुण

सूत्रसंचालन, प्रास्ताविक, परिचय, स्वागत-सत्कार , मनोगत, आभार इत्यादी.

♦ ♦ ♦ ♦ ♦

सत्र दुसरे — ८० गुण

घटक - ४ नेमलेला कविता संग्रह ' मातृपंचक ' - संपादक डॉ. स्नेहल तावरे, डॉ. वेदश्री थिगळे — ३० गुण

घटक - ५	अ.	वर्तमानपत्रासाठी बातमी लेखन	५ गुण
	ब.	दृक-श्राव्य माध्यमांसाठी(आकाशवाणी व दूरदर्शन) मुलाखत लेखन	५ गुण
	क.	प्रशासकीय इंग्लिश पारिभाषिक संज्ञांचे मराठीकरण करणे.	५ गुण
	ड.	अशुद्ध शब्द शुद्ध स्वरूपात लिहिणे.	५ गुण

- 'मराठी विनोदी कथा' आणि 'मातृपंचक' ही दोन पुस्तके मराठी अभ्यासमंडळाने क्रमिक म्हणून नेमलेली आहेत. दुस-या सत्रात ८० गुणांची विभागणी खालीलप्रमाणे राहील.

• प्रथम सत्र -	मराठी विनोदी कथा	-	२० गुण
	व्यावहारिक आणि उपयोजित मराठी	-	१० गुण
• द्वितीय सत्र -	मातृपंचक	-	३० गुण
	व्यावहारिक आणि उपयोजित मराठी	-	२० गुण
		एकूण	८० गुण

पुणे विद्यापीठ

प्रथम वर्ष कला (एफ.वाय.बी.ए.) - जून २०१३-१४ पासून

प्रश्नपत्रिकेचे स्वरूप व गुण विभागणी आराखडा पुनर्रचित अभ्यासक्रम

प्रथम सत्रांत परीक्षा

पाठ्यपुस्तक : 'मराठी विनोदी कथा' व व्यावहारिक आणि उपयोजित मराठी

वेळ - २.०० तास **एकूण गुण - ६०**

प्रश्न १ ला - मराठी विनोदी कथा

(उत्तरे २० शब्दांपर्यंत, त्यासाठी १२ प्रश्न विचारणे - १० सोडविणे.) १० गुण

प्रश्न २ रा- मराठी विनोदी कथा

(उत्तरे ५० शब्दांपर्यंत, त्यासाठी ४ प्रश्न विचारणे - २ सोडविणे.) ०८ गुण

प्रश्न ३ रा.- मराठी विनोदी कथा

(उत्तरे १५० शब्दांपर्यंत, त्यासाठी ४ प्रश्न विचारणे - २ सोडविणे.) १२ गुण

प्रश्न ४ था- मराठी विनोदी कथा १० गुण

(उत्तरे ३०० शब्दांपर्यंत, त्यासाठी २ प्रश्न विचारणे - १ सोडविणे.)

प्रश्न ५ वा - व्यावहारिक आणि उपयोजित मराठी

(अ) व्यक्तिमत्त्व विकास (२ प्रश्न विचारणे १ सोडविणे.) ०४ गुण

(ब) भाषिक कौशल्ये (४ प्रश्न विचारणे - २ सोडविणे.) ०८ गुण

(क) कार्यक्रम संयोजन कौशल्ये(४ प्रश्न विचारणे - २ सोडविणे.) ०८ गुण

पुणे विद्यापीठ

प्रथम वर्ष कला (एफ.वाय.बी.ए.) जून २०१३-१४ पासून

पुनर्रचित अभ्यासक्रम - वार्षिक परीक्षा

प्रश्नपत्रिकेचे स्वरूप व गुण विभागणी आराखडा - जून २०१३ पासून

पाठ्यपुस्तक : 'मातृपंचक', 'मराठी विनोदी कथा' व व्यावहारिक आणि उपयोजित मराठी

वेळ - ३.०० तास एकूण गुण- ८०

प्रश्न १ - 'मातृपंचक' आणि 'मराठी विनोदी कथां'वर प्रश्न विचारणे २०गुण
(उत्तरे २० शब्दांपर्यंत. मातृपंचकवर ०७ आणि मराठी विनोदी कथांवर
०७ प्रश्न विचारणे - प्रत्येक गटातील ५ सोडविणे, प्रत्येक प्रश्नास दोन गुण)

प्रश्न २ - 'मातृपंचक' या कवितासंग्रहावर प्रश्न विचारणे
(उत्तरे ५० शब्दांपर्यंत, त्यासाठी ४ प्रश्न विचारणे - २ सोडविणे.) १०गुण

प्रश्न ३ - 'मातृपंचक' आणि 'मराठी विनोदी कथा' दीर्घोत्तरी प्रश्न विचारणे २०गुण
(उत्तरे ३०० शब्दांपर्यंत, 'मातृपंचक' आणि 'मराठी विनोदी कथा'
प्रत्येक गटासाठी २ प्रश्न विचारणे -१ सोडविणे. प्रत्येक प्रश्नाला १० गुण)

प्रश्न ४ - व्यावहारिक व उपयोजित मराठी यावर प्रश्न विचारणे २०गुण
उत्तरे १५० शब्दांपर्यंत, त्यासाठी प्रथम सत्रावर (भाषिक आणि कार्यक्रम संयोजन कौशल्ये यावर) दोन प्रश्न विचारणे पैकी एक सोडविणे आणि द्वितीय सत्रातील अभ्यासक्रमावर (वर्तमानपत्र,आकाशवाणी,दूरदर्शन यावर) पाच प्रश्न विचारणे. पैकी ३ प्रश्न सोडविणे. एकूण ४ प्रश्न सोडविणे. प्रत्येक प्रश्नास ५ गुण असतील.

प्रश्न ५ - पारिभाषिक संज्ञा व अशुद्ध शब्द शुद्ध करून लिहिणे
अ गट - पारिभाषिक संज्ञा, त्यासाठी ८ संज्ञा देणे व ५ लिहिणे.) ५गुण
ब गट - अशुद्ध शब्द शुद्ध करून लिहिणे, ८ शब्द देणे -५ लिहिणे.) ५ गुण

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● संदर्भ ग्रंथ

1 विनोद : तत्त्व आणि स्वरूप– डॉ. गो.मा. पवार

2 मराठी साहित्य प्रेरणा आणि स्वरूप - संपादक, डॉ. गो. मा. पवार, डॉ. म.द. हातकणंगलेकर

3 साहित्यमूल्य आणि अभिरुची - डॉ. गो. मा. पवार

4 वाङ्.मयीन निरीक्षणे - डॉ. दत्तात्रय पुंडे

5 काही साहित्यिक : काही साहित्यकृती - डॉ. भीमराव कुलकर्णी

6 मराठी साहित्य अध्यापन आणि प्रकार (विनोद : एक वाङ्.मय प्रकार, विनोदाचे वाङ्.मयीन रूप) वा.ल.कुलकर्णी गौरव ग्रंथ, संपादक श्री. पु. भागवत, डॉ. सुधीर रसाळ

7 विनोद : एक व्याख्यान - डॉ. अ. वा. वर्टी

8 हास्यविनोद मीमांसा - डॉ. न. चिं. केळकर

9 व्यावहारिक मराठी - पुणे विद्यापीठ प्रकाशन.

10 व्यावहारिक मराठी - डॉ. कल्याण काळे, डॉ. दत्तात्रय पुंडे

11 व्यावहारिक मराठी - संपा. डॉ. स्नेहल तावरे, स्नेहवर्धन प्रकाशन, पुणे.

12 व्यावहारिक मराठी - डॉ. लीला गोविलकर, डॉ. जयश्री पाटणकर, स्नेहवर्धन प्रकाशन

13 व्यावहारिक मराठी - डॉ. सयाजीराजे मोकाशी, डॉ. रंजना नेमाडे

14 व्यावहारिक मराठी - डॉ.ल. रा. नसिराबादकर, फडके प्रकाशन, कोल्हापूर

15 मराठी भाषेची संवाद कौशल्ये (पुस्तक क्र १ ते ८) य.च.म.मुक्त विद्यापीठ, नाशिक.

16 प्रसारमाध्यमांसाठी लेखन कौशल्ये - य.च.म.मुक्त विद्यापीठ, नाशिक.

17 व्यक्तिमत्त्व विकास - य.च.म.मुक्त विद्यापीठ, नाशिक.

18 कहाणी वर्तमानपत्राची–चंचल सरकार(अनुवाद) - दिनकर गांगल, नॅशनल बुक ट्रस्ट

19 व्यक्तिमत्त्व विकास आणि भाषा - डॉ. मधुकर मोकाशी

20 वैखरी , भाषा आणि भाषा व्यवहार - डॉ. अशोक केळकर

21 द्विभाषी व्यावहारिक शब्दकोश (इंग्लिश - मराठी) - गणेश ओतुरकर

22 प्रसारमाध्यमे आणि मराठी भाषा - संपादक डॉ. भास्कर शेळके.

23 व्यावहारिक मराठी भाषा - शरदिनी मोहिते

24 चर्वणा - रा.श्री. जोग, बाळ गाडगीळ

25 व्यावहारिक आणि उपयोजित मराठी - डॉ. मनोहर रोकडे

26 व्यासपीठ - डॉ. महादेव वाळुंज

27 मराठी भाषा उपयोजन आणि सर्जन - प्रा. सुहासकुमार बोबडे

28 पारिभाषिक संज्ञा कोश (इंग्लिश -मराठी)- डॉ. स्नेहल तावरे.

29 यशाचा शिल्पकार तूच - कर्नल शशी आनंद, अनुवाद विनीता आपटे

30 यशस्वी जीवनाचे रहस्य - डॉ. प्र. चिं. शेजवलकर

31 उपयोजित मराठी - डॉ. केतकी मोडक, प्रा. सुजाता शेणई ,संतोष शेणई

32 मराठी लेखन - कोश - अरुण फडके

33 शुद्ध शब्द कोश - डॉ. स्नेहल तावरे

34 शुद्ध लेखन विवेक - द. न. गोखले

35 मराठी शुद्धलेखन प्रदीप - मो. रा. वाळंबे

36 मराठी लेखन मार्गदर्शिका - यास्मिन शेख

37 व्यावहारिक मराठी - प्रकाश परब

38 मराठीचिये नगरी - श्री.ना. चाफेकर

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पुणे विद्यापीठ

विषय : मराठी - पुनर्रचित अभ्यासक्रम , जून २०१३ पासून पुढे

प्रथम वर्ष कला - सामान्यस्तर अभ्यासपत्रिका क्रमांक - १

पर्यायी अभ्यासक्रम

व्यावहारिक व उपयोजित मराठी

- उद्दिष्टे -

१ संज्ञापनातील भाषेची भूमिका, विविध भाषिक आविष्कारांचे स्वरूप समजावून देणे. भाषिक कौशल्ये, क्षमता विकसित करणे.

२ भाषिक कौशल्यांचे विविध आविष्कार आणि संपर्कमाध्यमे यांचा परस्पर संबंध समजावून देणे व उपयोजन करणे

३ मराठीचा कार्यालयीन/व्यावसायिक कामकाजात वापर,गरज व स्वरूपविशेषांची माहिती करून देणे.

४ कार्यालयीन/व्यावसायिक भाषाव्यवहारासाठी आवश्यक लेखन कौशल्याचे संपादन व उपयोजन करणे.

प्रथम सत्र ६० गुण

घटक

१ जीवन व्यवहारातील भाषेचे स्थान -

- भाषा म्हणजे काय ? विविध क्षेत्रातील भाषाव्यवहारांची ओळख

२ भाषिक कौशल्ये -

प्राथमिक - श्रवण, भाषण, संभाषण, लेखन, वाचन,

प्रगत - भाषांतर , सारांश लेखन

३ निबंध लेखन - वर्णनात्मक, चर्चात्मक आणि ललित

४ सारांश लेखन - स्वरूप आणि महत्त्व.

(घोषवाक्य तयार करणे, शीर्षक देणे, दिलेल्या संवादाचा संक्षेप करणे, संवादाचा विस्तार, वाक्प्रचारांचे उपयोजन, शब्दप्रयोजन, अनेक शब्दांसाठी एक शब्द, दोन कल्पनांचे एकत्रीकरण, समास, संधी इत्यादी, दिलेल्या उता-याचे भाषांतर व सारांश लेखन.)

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पुणे विद्यापीठ

विषय : मराठी - पुनर्रचित अभ्यासक्रम , जून २०१३ पासून पुढे

प्रथम वर्ष कला - सामान्यस्तर अभ्यासपत्रिका क्रमांक - १

पर्यायी अभ्यासक्रम

व्यावहारिक व उपयोजित मराठी

द्वितीय सत्र ८० गुण

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५ संवाद लेखन-

विविध माध्यमांसाठी होणारे संवाद,

सुचविलेल्या प्रसंगावर आधारित संवाद लेखन आणि ई-मेलचा वापर.

६ भाषांतर -

भाषांतर म्हणजे काय? भाषांतर शास्त्र की कला ?

भाषांतराची आवश्यकता, भाषांतर करताना येणा-या अडचणी.

भाषांतर आणि रूपांतर, लक्ष्यनिष्ठ आणि मूलनिष्ठ भाषांतर.

इंग्लिश उता-याचे मराठी भाषांतर.

७ प्रमाण भाषेचे लेखन-

मुद्रित शोधन, मुद्रित शोधनाची गरज, तंत्र व चिन्हे.
शुद्धलेखनाची संकल्पना, मराठीतील लेखनविषयक नियम .

८ परिभाषा - आवश्यकता -

विविध क्षेत्रातील पारिभाषिक शब्दांची ओळख आणि वर्गीकरण.

दुस-या सत्रात ८० गुणांची विभागणी खालीलप्रमाणे राहील.

प्रथम सत्रातील -	३० गुणांचा अभ्यासक्रम घ्यावा	-	३० गुण
द्वितीय सत्रातील -	५० गुणांचा अभ्यासक्रम घ्यावा	-	५० गुण

एकूण गुण ८०

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संदर्भ ग्रंथ -

१ व्यावहारिक मराठी - पुणे विद्यापीठ प्रकाशन.

२ व्यावहारिक मराठी - डॉ. कल्याण काळे, डॉ. दत्तात्रय पुंडे, निराली प्रकाशन, पुणे.

३ व्यावहारिक मराठी - संपा. डॉ. स्नेहल तावरे, स्नेहवर्धन प्रकाशन, पुणे.

४ व्यावहारिक मराठी - डॉ. लीला गोविलकर, डॉ. जयश्री पाटणकर, स्नेहवर्धन प्रकाशन

५ व्यावहारिक मराठी - डॉ. सयाजीराजे मोकाशी, डॉ.. रंजना नेमाडे

६ व्यावहारिक मराठी - डॉ. ल. रा. नसिराबादकर, फडके प्रकाशन, कोल्हापूर

७ प्रसारमाध्यमांसाठी लेखन कौशल्ये - य.च.म.मुक्त विद्यापीठ, नाशिक.

८ कहाणी वर्तमानपत्राची-चंचल सरकार (अनुवाद) - दिनकर गांगल नॅशनल बुक ट्रस्ट

९ द्विभाषी व्यावहारिक शब्दकोश (इंग्लिश - मराठी) - गणेश ओतुरकर

१० प्रसारमाध्यमे आणि मराठी भाषा - संपादक डॉ. भास्कर शेळके.

११ व्यावहारिक मराठी भाषा - शरदिनी मोहिते

१२ भाषांतर मीमांसा - डॉ. कल्याण काळे, डॉ. अंजली सोमण

१३ भाषांतर चिकित्सा - डॉ. मधुकर मोकाशी

१४ व्यावहारिक , उपयोजित मराठी आणि प्रसारमाध्यमे - संपा. डॉ. संदीप सांगळे

१५ व्यावहारिक आणि उपयोजित मराठी - डॉ. मनोहर रोकडे

१६ मराठी भाषा उपयोजन आणि सर्जन - प्रा. सुहासकुमार बोबडे

१७ पारिभाषिक संज्ञा कोश (इंग्लिश -मराठी)- डॉ. स्नेहल तावरे.

१८ उपयोजित मराठी- डॉ. केतकी मोडक, प्रा. सुजाता शेणई ,संतोष शेणई

१९ व्यावहारिक मराठी - प्रकाश परब

२० निबंध : शास्त्र व कला - डॉ. प्र. न. जोशी

२१ निबंध व लेखन - निर्मला किराणे.

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पुणे विद्यापीठ

प्रथम वर्ष वाणिज्य

विषय : मराठी - पुनर्रचित अभ्यासक्रम , जून २०१३ पासून पुढे

मराठी : अभ्यासक्रमपत्रिका (1521)

अ - अभ्यासक्रमाचे शीर्षक - ' यशोगाथा' पाठयपुस्तक आणि व्यावहारिक मराठी

ब- अभ्यासक्रमाची उद्दिष्टे-

१ वाणिज्य विषयाच्या विद्यार्थ्यांना मराठीच्या व्यवहारक्षेत्राची माहिती देणे. विविध क्षेत्रातील भाषा व्यवहाराचे स्वरूप व गरज समजावून देणे.

२ या व्यवहार क्षेत्रातील मराठी भाषेचे स्थान स्पष्ट करणे व त्यातील मराठीच्या प्रत्यक्ष वापराचा अभ्यास करणे.

३ विविध क्षेत्रातील मराठीचा अभ्यास करण्यासाठी प्रसारमाध्यमाचे स्वरूप व त्यातील भाषण व्यवहार समजावून देणे.

४ प्रसारमाध्यमातील विविध लेखन प्रकारांचा अभ्यास व प्रत्यक्ष लेखन.

५ राजभाषा म्हणून मराठीचे स्थान, कार्यालयीन भाषेचे स्वरूप, मराठीतून लेखन करतांना येणा-या अडचणी, कार्यालयीन भाषेची तंत्रे व कौशल्ये, अर्थकारण व वाणिज्य विषय मराठीतून परिणामकारकरित्या मांडता यावा यासाठी कौशल्यांची आवश्यकता आहे. मराठीत आजवर या दिशेने कोणते प्रयत्न झालेत याची माहिती विद्यार्थ्यांना देणे आवश्यक आहे.

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पुणे विद्यापीठ

प्रथम वर्ष वाणिज्य

विषय : मराठी - पुनर्रचित अभ्यासक्रम , जून २०१३ पासून पुढे

मराठी : अभ्यासक्रमपत्रिका (1521)

प्रथम सत्र ६० गुण

अ- निबंध लेखन - वैचारिक, ललित आणि वाणिज्य विषयक

ब- पाठ्यपुस्तक - ' यशोगाथा' - डॉ. प्र. चिं. शेजवलकर

- दुसरे सत्र

व्यावहारिक आणि उपयोजित मराठी

१ निबंधलेखन

२ प्रशासनिक मराठी

- अ अर्जलेखन
- ब कार्यालयीन टिपण्णीलेखन,
- क इतिवृत्त लेखन,
- ड घोषणापत्रक
- इ निविदा
- फ माहितीपत्रक

३ जाहिरात लेखन आणि जाहीर निवेदन

४ वाणिज्यविषयक पारिभाषिक संज्ञा

५ सारांशलेखन

६ भाषांतर (इंग्लिशचे मराठीत)

द्वितीय सत्राच्या अखेरीस २० गुणांची मौखिक परीक्षा संपूर्ण अभ्यासक्रमावर घ्यावी.

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पुणे विद्यापीठ

प्रथम वर्ष वाणिज्य

विषय : मराठी - पुनर्रचित अभ्यासक्रम , जून २०१३ पासून पुढे

प्रश्नपत्रिकेचे स्वरूप व गुण विभागणी आराखडा

प्रथम सत्रांत परीक्षा

पाठ्यपुस्तक : 'यशोगाथा' आणि निबंध

वेळ -२.०० तास एकूण गुण-६०

प्रश्न १ ला - निबंधलेखन १० गुण

१ ललित
२ वैचारिक
३ वाणिज्य विषयक
(चार विषय देणे व एक ५०० शब्दांपर्यंत सोडविणे)

प्रश्न २ रा - 'यशोगाथा' पाठ्यपुस्तकातील लेखांवर प्रश्न विचारणे १० गुण
(उत्तरे २० शब्दांपर्यंत , त्यासाठी १२ प्रश्न विचारणे - १० सोडविणे.)

प्रश्न ३ रा. - 'यशोगाथा' पाठ्यपुस्तकातील लेखांवर प्रश्न विचारणे २० गुण
(उत्तरे ५० शब्दांपर्यंत, त्यासाठी ६ प्रश्न विचारणे - ४ सोडविणे.)

प्रश्न ४ था.- 'यशोगाथा' पाठ्यपुस्तकातील लेखावर प्रश्न विचारणे २० गुण
(उत्तरे १५० शब्दांपर्यंत त्यासाठी ४ प्रश्न विचारणे - २ सोडविणे.)

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पुणे विद्यापीठ

विषय : मराठी - पुनर्रचित अभ्यासक्रम , जून २०१३ पासून पुढे

प्रथम वर्ष वाणिज्य

प्रश्नपत्रिकेचे स्वरूप व गुण विभागणी आराखडा

वार्षिक परीक्षा

पाठ्यपुस्तक : 'यशोगाथा' व व्यावहारिक आणि उपयोजित मराठी

वेळ -२.०० तास **एकूण गुण-६०**

प्रश्न १ ला - निबंधलेखन १० गुण

१ ललित
२ वैचारिक
३ वाणिज्य विषयक
(चार विषय देणे व एक ५०० शब्दांपर्यंत सोडविणे)

प्रश्न २ रा - 'यशोगाथा' पाठ्यपुस्तकावर प्रश्न विचारणे १० गुण
(उत्तरे २० शब्दांपर्यंत. त्यासाठी १२ प्रश्न विचारणे १० सोडविणे.)

प्रश्न ३ रा.- प्रशासनिक मराठी २० गुण
(त्यासाठी ६ प्रश्न विचारणे -४ सोडविणे.)

प्रश्न ४ था.-जाहिरात लेखन,जाहीर निवेदन आणि पारिभाषिक संज्ञा यावर प्रश्न विचारणे
अ गट- जाहिरात लेखन,जाहीर निवेदन
(त्यासाठी २ प्रश्न विचारणे १ सोडविणे.) ०५ गुण
ब गट -वाणिज्यविषयक पारिभाषिक संज्ञा ०५ गुण
(७ विचारणे व ५ सोडविणे.)

प्रश्न ५ वा- भाषांतर किंवा सारांश लेखन १० गुण

(भाषांतर लेखनाचा एक आणि सारांशासाठी एक उतारा देणे. पैकी एक सोडविणे.
भाषांतर लेखनाचा /सारांशलेखनाचा यासाठी किमान १०० शब्दांचा उतारा असावा.)

द्वितीय सत्राच्या अखेरीस २० गुणांची मौखिक परीक्षा संपूर्ण अभ्यासक्रमावर घ्यावी.

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संदर्भ ग्रंथ –

१ व्यावहारिक मराठी – पुणे विद्यापीठ प्रकाशन.

२ व्यावहारिक मराठी – डॉ. कल्याण काळे, डॉ. दत्तात्रय पुंडे, निराली प्रकाशन, पुणे.

३ व्यावहारिक मराठी – संपा. डॉ. स्नेहल तावरे, स्नेहवर्धन प्रकाशन, पुणे

४ व्यावहारिक मराठी – डॉ. लीला गोविलकर, डॉ. जयश्री पाटणकर, स्नेहवर्धन प्रकाशन

५ व्यावहारिक मराठी – डॉ. सयाजीराजे मोकाशी, प्रा. रंजना नेमाडे

६ व्यावहारिक मराठी – डॉ. ल. रा. नसिराबादकर, फडके प्रकाशन, कोल्हापूर

७ प्रसारमाध्यमांसाठी लेखन कौशल्ये – य.च.म.मुक्त विद्यापीठ, नाशिक.

८ कहाणी वर्तमानपत्राची–चंचल सरकार अनुवाद – दिनकर गांगल नॅशनल बुक ट्रस्ट

९ द्विभाषी व्यावहारिक शब्दकोश (इंग्लिश – मराठी) – गणेश ओतुरकर

१० प्रसारमाध्यमे आणि मराठी भाषा – संपादक डॉ. भास्कर शेळके.

११ व्यावहारिक मराठी भाषा – शरदिनी मोहिते

१२ भाषांतर मीमांसा – डॉ. कल्याण काळे

१३ भाषांतर चिकित्सा – डॉ. मधुकर मोकाशी

१४ व्यावहारिक , उपयोजित मराठी आणि प्रसारमाध्यमे – संपा. डॉ. संदीप सांगळे

१५ व्यावहारिक आणि उपयोजित मराठी – डॉ. मनोहर रोकडे

१६ मराठी भाषा उपयोजन आणि सर्जन – प्रा. सुहासकुमार बोबडे

१७ पारिभाषिक संज्ञा कोश (इंग्लिश –मराठी)– डॉ. स्नेहल तावरे.

१८ उपयोजित मराठी- डॉ. केतकी मोडक, प्रा. सुजाता शेणई ,संतोष शेणई

१९ व्यावहारिक मराठी - प्रकाश परब

२० जाहिरातशास्त्र - डॉ. वंदना खेडीकर

२१ निबंध : शास्त्र व कला - डॉ. प्र. न. जोशी

२२ निबंध व लेखन - निर्मला किराणे.

२३ मराठी लेखन - कोश - अरुण फडके

२४ शुद्ध शब्द कोश - डॉ. स्नेहल तावरे

२५ शुद्ध लेखन विवेक - द. न. गोखले

२६ मराठी शुद्धलेखन प्रदीप - मो. रा. वाळंबे

२७ मराठी लेखन मार्गदर्शिका - यास्मिन शेख

२८ व्यावहारिक मराठी - प्रकाश परब

२९ मराठीचिये नगरी - श्री.ना. चाफेकर

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First Year B.A.

History General Paper No. 1

Chh. Shivaji and His Times

(1630 – 1707)

Objectives :

To Introduce innovative study techniques in the study of History *of Maratha to make it value based, conceptual and thought* provocative. To introduce International elements in the study of Marathas to facilitate comparative analysis of this history. To highlight the importance of past in exploration of present context. To understand the Socio –economic, cultural and political background of 17th century Maharashtra. To increase the spirit of healthy Nationalism & Secularism among the student. To encourage student s to for competitive examinations. To promote interest in the discipline of History. Suggesting the Importance of References.

First Term-

1. Sources. 10
   - A) Literary Sources.
     1) Sanskrit
     2) Marathi
     3) Hindi
     4) Persian
   - B) Foreign Sources.
     1) Portuguese
     2) Dutch
     3) French
     4) English
   - C) Travellers Accounts.
2. Conceptual study of Chh. Shivaji and his times. 7
   - 1) Bhakti. 2) Watan
   - 3) Saranjam . 4) Mansab
   - 5) Jahagir 6) Jiziya
   - 7) Guerrilla Warfare 8) Maharashtra Dharma

9) Shiledars
10) Swarajya
11) Chauth
12) Inam
13) Baragirs.
14) Sardeshmukhi.

3. Rise and Consolidation of Maratha power. 13
   1) Establishment of the Swarajya
   2) Shivaji - Adilashahi Relations
   3) Shivaji - Mughal Relation s
   4) Shivaji's Coronation.
   5) Karnataka Expedition.

4. Administration Under Chh.Shivaji 8
   1) Central
   2) Provincial
   3) Military
   4) Judiciary.
5. Chh. Shivaji & Foreign Powers. 10
   1) Portuguese.
   2) Dutch.
   3) French.
   4) British.

Second Term.

6. Chh. Sambhaji's Achievments 10
   1) Consolidation of power.
   2) Relations with Mughals.
   3) Relations with Foreign Powers.
   4) Evaluation.
7. Maratha War of Independence . 10
   1) Chh. Rajaram and his Achievements.
   2) Maharani Tarabai & her Achievements.
   3) Contribution of Santaji Ghorpade, Dhanaji Jadhav & Ramchandrapant Amatya.

8. Social Life. 10
   1) Gavgada.
   2) Woman
   3) Religious
9. Economic Life. 10
   1) Agriculture And Revenue System
   2) Sources of income
   3) Trade & Commerce
   4) Currency
10. Arts & Architecture .(Special Ref. to Temple, Gadhi, and Forts) 8

Books for Study :

1. M.G. Ranade-Rise of the Maratha Power.
2. G.S. Sardesai-New History of the Marathas, Vols. I, II and III.
3. J.N. Sarkar-Shivaji and His Times.
4. S.N. Sen-Administrative System of the Marathas.
5. S.N. Sen-Military System of the Marathas.
6. Nadkarni R. V. –Rise and fall of the Maratha Empire.
7. Sarkar J.N.-House of Shivaji.
8. Dr. Balkrishna – Shivaji the Grate.
9. Pagadi Setu Madhavrao – Chh. Shivaji

मराठी ग्रंथ :

१. अ.रा. कुलकर्णी व ग.ह. खरे (संपा.)—मराठ्यांचा इतिहास, खंड १ त ३.

२. प्र.न. देशपांडे—मराठी सत्तेचा उदय आणि उत्कर्ष.

३. वा.कृ. भावे—शिवराज्य व शिवकाल.

४. बेंद्रे, वा.सी. — शिवाजी महाराजांचे विधिचिकित्सक चरित्र.

५. रामचंद्र पंत अमात्य — आज्ञापत्र.

६. सौ.कमल गोखले — शिवपुत्र संभाजी.

७. काळे, दि.वि.—छत्रपती शिवाजी महाराज.

८. शहा, जी.बी. — उपेक्षीत दुर्ग, भाग एक व दोन

९. तांबोळी, एन.एस. — मराठयांचा इतिहास

१०. चिटणिस, कृ.ना. — मध्ययुगीन भारतीय संस्था व संकल्पना, खंड १ ते ४.

११. पवार जयसिंगराव — मराठी सत्तेचा उदय व उत्कर्षे

१२. सावंत, व जाधव — मराठयांचा प्रशासकिय, सामाजिक व आर्थिक इतिहास

१३. कदम उमेश — मराठा—फ्रेंच संबंध

१४. पिसुर्लेकर पांडुरंग — मराठा—पोर्तुगीज संबंध

१५. बेंद्रे. वा.सी. — छत्रपती संभाजी महाराजांचे विचिकित्सक चरित्र

१६. पवार जयसिंगराव — महाराणी ताराबाई

१७. शिवदे सदाशिव — महाराणी ताराबाई

१८. पवार जयसिंगराव — संताजी घोरपडे स्मारक ग्रंथ

१९. कुलकर्णी, अ.रा. — शिवकालीन महाराष्ट्र

२०. माटे, म.श्री. — मराठे कालीन वास्तूकला

२१. पाटील आर.ए. — मराठयांचा इतिहास

२२. सरदेसाई गो.स. — मराठी रियासत, खंड १ ते ३

२३. कठारे अनिल व घोडके जयश्री — शिवकालीन महाराष्ट्र

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University of Pune

First Year B.A.

History of Civilization : Cultural History of Maharashtra (upto 13th century)

Objectives

1. To introduce the student to the culture of Maharashtra from ancient times onwards.
2. To create a sense of pride in the student about his cultural tradition.
3. To highlight how this regional cultural identity forms a part of the main flow of the Indian cultural tradition.
4. To restructure the value based syllabus.
5. To get acquainted with basic concepts, theories and methodology of social philosophy.
6. New thoughts, trends and ideologists should be included and knowledge extension needs to be taken into consideration.

First Term 12

1. Civilization
    1. Concept & scope of civilization
    2. Geographic identity of Maharashtra
    3. Nomenclature of Maharashtra
    4. Origin of Marathi language
2. Maharashtra Culture 12
    1. Concept & scope of civilization
    2. Cultural identity of Maharashtra
    3. Proto historic culture – Dayamabad, Nevase, Inamgaon
    4. Megalithic culture
3. Political outline 12
    1. Satvahan
    2. Vakatak
    3. Rashtrakut
    4. Chhatrap
    5. Shilahar
    6. Yadav

4. Social Life 12
    1. Caste System
    2. Village Life
    3. Position of Women
    4. Fairs & Festivals

Second Term

5. Economic life 12
    1. Agriculture
    2. Trade and commerce
6. Art and Architecture 12
    1. Sculpture, Painting, Folk Arts
    2. Caves, Forts and temples
7. Bhakti Cult – Philosophy and teaching 12
    1. Nath
    2. Mahanubhav
    3. Varkari
    4. Shakti
8. Literature – A brief survey 12
    1. Sanskrit, Spl. Ref. to Manassollas
    2. Prakrit, Spl. Ref. to Gatha Saptshati
    3. Apabbramsha, Spl. Ref. to Jain Agam
    4. Marathi, Spl. Ref. to Jyotish Ratnamala, Lila Charitra, Vivek Sindu

Books for Study :

1. Gokhale B.G., Buddhism in Maharashtra,
   Popular Prakashan, Mumbai, 1976.
2. Mate M.S., Maratha Architecture, Mansanman
   Publication, Pune.

मराठी

१. जोगळेकर ग.ना. (संपा), गाथासप्तशती
२. साखरे विजया — वाकाटक कला

३. साखरे विजया — पुरातत्व विद्या.

४. कठारे अनिल व साखरे विजया — भारतीय कलेचा इतिहास.

५. कुलकर्णी गो.त्रं., मध्ययुगीन महाराष्ट्राचा इतिहास इ.स. १२९६—१६३६, महाराष्ट्र राज्य साहित्य संस्कृती मंडळ, मुंबई, २००१.

६. केतकर श्री.व्यं., प्राचीन महाराष्ट्र, वरदा प्रकाशन, पुणे, १९८९.

७. जाधव रा.ग. संपा., विचारशिल्प, कॉन्टिनेन्टल प्रकाशन, पुणे, १९९४.

८. जोशी महादेवशास्त्री, गाजती दैवते, ज्ञानराज प्रकाशन, पुणे १९५९.

९. जोशी वसंत (संपा), मराठी संस्कृती काही समस्या, व्हीनस प्रकाशन, पुणे १९८०.

१०. डिसकळकर द.बा., महाराष्ट्राचा प्राचीन इतिहास आणि संस्कृति, पुणे विद्यापीठ, पुणे, १९६७.

११. ढेरे रा.चिं., नाथ संप्रदायाचा इतिहास, पद्मगंधा प्रकाशन, पुणे, २००१.

१२. ढेरे रा.चिं., महाराष्ट्राचा देव्हारा, विश्वकर्मा प्रकाशन, पुणे १९७६.

१३. तुळपुळे शं.गो., प्राचीन मराठी कोरीव लेख, पुणे विद्यापीठ प्रकाशन, पुणे, १९६३.

१४. दांडेकर गो.नी., महाराष्ट्र दर्शन, मृण्मयी प्रकाशन, पुणे, २००१.

१५. पाठक अ.शं. संपा., इतिहास: प्राचीन काळ खंड १, दर्शनिका विभाग, मुंबई २००२.

१६. पाठक अ.शं. संपा., महाराष्ट्र: इतिहास प्राचीन काळ खंड १, भाग २ स्थापत्य व कला, दर्शनिका विभाग, मुंबई २००२.

१७. माटे म.श्री., प्राचीन भारतीय कला, कॉन्टिनेन्टल प्रकाशन, पुणे.

१८. सोवनी म.वि., महाराष्ट्राच्या कालमुद्रा, नितीन प्रकाशन, पुणे, १९८३.

१९. सहस्त्रबुध्दे पु.ग., महाराष्ट्र संस्कृती, कॉन्टिनेन्टल प्रकाशन, पुणे, १९७९.

२०. शेणोलीकर ह.श्री. व देशपांडे प्र.न. — महाराष्ट्र संस्कती.

२१. पानसे मु.ग. — यादवकालीन महाराष्ट्र.

२२. ढवळीकर म.के. — महाराष्ट्राची कुळकथा

२३. सांकलिया (संपा) — महाराष्ट्राचे पुरातत्व

२४. देव शं.भा. — पुरातत्व विद्या

२५. ढवळीकर म.के. — महाराष्ट्राची पुरातत्व विद्या.

२६. अत्रे शुभांगणा — महाराष्ट्र संस्कृती.

२७. गोखले शोभना — पुराभिलेख विद्या.

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UNIVERSITY OF PUNE

(Revised Syllabus From 2014-15)

Modern- India (1857-1950)

S.Y.B.A. (History)

General Paper 2

Objectives:-

The course is designed to help the student to know- History of freedom movement of India, aims, objectives problems and progress of Independent India. It aims at enabling the student to understand the processes of rise of modern India. The Course attempts to acquaint student with fundamental aspects of Modern Indian History. To explain the basic concepts/ concerns/ frame work of Indian History.

First- Term

Unit I - Conceptual Study **8**

1. Modernity
2. Rule of Law
3. Drain of wealth
4. Nationalism
5. Home- Rule
6. Satyagraha
7. Communalism
8. Dyarchy

Unit II - Uprising of 1857 **10**

1. Causes, course and effects
2. Various Views
3. Causes of failure

Unit III - Social and Religious Movement (Special reference to institutional work) **10**

1. Brahmo Samaj
2. Arya Samaj
3. Prarthna Samaj

4. Theosophical Society

5. Satyashodhak Samaj

Unit IV - Indian Nationalism **10**

1. Rise and Growth

2. Foundation of Indian National Congress.

3. The Moderates and Extremists.

4. Revolutionary Nationalism

Spl. Ref. (Abhinav Bharat, Gadar, Anushilan Samitee,Yugantar,Hindustan Socialist Republican Army)

Unit V - Administrative Policy of the British **10**

1. Education

2. Press

3. Famine

4. Local self government

5. Land Revenue systems

Second Term

Chapter VI - Mahatma Gandhi and Indian National movement **10**

1. Philosophy

2. Non - Co operation

3. Civil Disobedience

4. Quit India

Chapter VII - Rise and Growth of communalism **10**

1. Muslim League

2. Khilafat movement

3.Two Nation Theory

4. Partition

Chapter VIII - Constitutional Development **10**

1. Morley Minto Act - 1909
2. Montegue - Chelmsford Act - 1919
3. Provincial Autonomy - 1935
4. Various Constitutional Plans 1942 to 1946 (Crips mission, Wavell plan, Cabinate mission)
5. The last phase - Transfer of power (Mountbatten plan and India's Independence Act - 1947)

Chapter IX - Subaltern Movement **10**

1. Dalit Movement
2. Women's Movement
3. Peasant Movement
4. Tribal Movement
5. Workers Movement

Chapter X - India after Independence **8**

1. Consequences of partition
2. Integration of princely state: Hyderabad, Junagad & Kashmir.

Books for Study: English

1. Bipinchanda - India's struggle for freedom
2. Bearce, George D - British attitude towards India
3. Bipinchanda - The Rise and Growth of Economic Nationalism
4. Desai A.R. - Social background of India Nationalism
5. Dodwell H.H. - Cambridge History of India Vol V,VI
6. Dutt R.C. - Economic History of India Vol 1,2
7. Gopal S. - British policy in India 1858-1905
8. Majumdar R.C. - British paramountcy and Indian Renaissance Vol IX
9. Menon V.P. - The transfer of power in India
10. Natrajan S. - A century of social Reform In India
11. Overstreet G.D. & Windmiller M. - Communism In India

12. Robert P.E. - History of British India

13. Sarkar Sumit - Bibliographical survey of social Reform movement in the 18th &19th century (ICHR 1975)

14. Stokes,Eric - The English Utilitarian's and India

15. Symond R.A. - The making of Pakistan

16. Tarachand - History of freedom movements in India

17. Shekhar Bandyo Padhyay - From Plessey to partition A History of modern India

18. G.K. Das & Sushma Arya (Ed.), Literature & Resistance India 1857, Primus Books, Delhi

Books for Study Marathi

1.K. Sagar(Anuvadit) Bharatiya Swatyantra Ladha, Bipin Chandra.

2. Adhunik Bharatacha Itihas -R. M. Lohar

3. Adhunik Bharat-S.D. Javdekar

4. Katha Swatyantryachi- Kumar Ketkar

5. Congresscha Itihas-(Anuvadit) Pattabhisitaramaiyya

6. Bharatiya Swatyantra Ladha- Mamasaheb Devgirikar

7. Adhunik Bharatacha Itihas- Dr. Suman Vaidya, Dr. Shanta Kothekar

8. Adhunik Bharatacha Itihas- Dr. Jaysinghrao Pawar.

9.Visavya Shatakatil Maharashtra- Y.D. Phadake

10.Sattantar- Tikekar

11.Maharashtratil Samaj Sudharnecha Itihas, Bhide- Patil.

12.Bharatiya Swatantrya Chalvalicha Itihas- Dr. Anil Kathare.

13. Bharatiya Paripeshatil Striya- Borde- Khadase,

14.Bharatiya Stri Chavalicha Itihas- Vijaya Sakhare.

15.Ambedkari Chalvalicha Itihas- Dr. Anil Kathare & Itar.

16. Adhunik Bharatacha Itihas-Dr.G.B. Shah, B.N. Patil.(Prashant Publication Jalgaon)

17.Adhunik Bharat (1750-2009), Dr. N.S. Tamboli & V.P. Pawar, Nirali Prakshan, Pune

University of Pune

Revised Syllabus (S.Y.B.A. History)
From 2014-15
Special Paper - I, Ancient India (3000 B.C. to 1206 AD)

First Term

Objectives:

To Survey the sources of History of Ancient India. The Course intends to provide an Understanding of the social, economic, religious and institutional bases of Ancient India. The course will study such as agriculture, Industry, trade. To study the development of the concept of Nation- State background of political history. To study ancient Indian Art & Architecture.

Unit - 1) Sources for the study of Ancient Indian History. **10**

a) Archaeological

b) Literary

c) Foreign Accounts

d) Epigraphical

e) Numismatics

Unit - 2) Conceptual study of Ancient Indian History **10**

1) Pre-history 2) Proto-history 3) Age of History 4) Stone Age

5) Bharatvarsh 6) Sabha- Samiti 7) Varnashram 8) Samakaras 9) Dandniti

10) Stupa-chaitya & Vihar 11) Alvars-Nayanars 12) Agraharas

13) Vishti 14) Hero-Stone (Memorial Stones) 15) Saptang theory

16) Mahajanapadas

Unit - 3) The Harappan Civilization **8**

a) Scope and features

b) Socio - Economic & Religious Life

c) Decline

Unit - 4) Vedic Culture **10**

a) Political, Social, Economic & Religious Life

b) Vedic literature

Unit - 5) Economic and religious Transformation **10**

a) Agriculture, Iron Technology, Urbanisation

b) New Religion, sects and its philosophy: Jainism, Buddhism and Charvak: Lokayats

Second Term

Unit - 6) The Mauryan Empire **10**

a) Rise & Expansion

b) Administration

c) Socio- Economic and Religious Life

d) Decline

Unit - 7) Satvahans **10**

a) Socio- economic condition

b) Religious

c) Cultural

Unit - 8) The Age of Imperial Guptas **10**

a) Political backgrounds

b) Administration

c) Socio- Economic and Religious Life

d) Science

Unit - 9) Harshavardhana and his Achievements **8**

Unit - 10) South Indian Dnyansties and their socio-cultural life **12**

a) Sangam Age : Brief Survey

b) Chalukyas

c) Pallavas

d) Rashtrakutas

e) Cholas

Ancient India

Books for study: English

1] Thapar Romila, A history of India, Penguin Books

2] Majumdar, R.C. Ancient India, Motilal Banarsidass Publishers Pvt.

3] Mahajan C.D. Ancient India, S. Chand & Company Ltd.

4] Thapar Romila, Cultural Past Essays in Early in Early Indian Historian Oxford University Press.

5] Chaurasia R.S. History of Ancient India, Forward Book Depot.

6] Altekar A.S., State and Government in Ancient India, Motilal Banarsidass Publishers Pvt.Ltd.

7] Prof.Ramesh Chandra, Temple of India , Commonwealth Publishers .

8] Basham A.L. The wonder that was India.

9] Rao B.V. History of Ancient India.

10] Altekar A.S. Rashtrakutas and their times.

11] A History of Ancient and early medieval India - sing Upinder, Pearson pub.

12] Uma Das Gupta, History of Science, Philosophy and culture in Indian civilization.

Marathi :

1) Vatkar Ashok, Rigvedapurviche Virat Dashradnya Yudhha, Manorama Prakashan Mumbai.

2) Gaydhani R.N., Prachin Bharatacha Itihas, K. Sagar Publications Pune

3) Dixit N.C. Prachin & Madhyayugin Bharat Prarambhapasun te A.D.1707. Pimpalapure & Co. Publishers Nagpur.

4) Mehta J.L. Mehta Sarita (Anu. Kale M.V.) Prachin Bharatacha Samagra Itihas. K. Sagar Publications Pune.

5) Kolarkar S.G. Prachin Bharatacha Rajkiya, Samajik, Sanskrutik Itihas.Aarambhapasun 1205 paryanta. Shree Mangesh Prakashan Nagapur.

6) Maharashtra Rajya Gazetteer.

7) Deshpande Brahmanand, Ajintha Margadarshak, Saket Prakashan.

8) Kulkarni A. R. Prachin Bharat Sanskriti Aani Itihas, Snehavardhan Prakashan Pune.

9) Sharma Ramsharan, Prachin Bharatacha Parichay, Orient Longman.

10) Shah G.B. Prachin Bharatacha Rajkiya Aani Sanskrutik Itihas, Prashant Publications Jalgaon.

11) Athavale Anu, Sadashiv Bopardikar, (Anu. Mudhusudan), Prachin Bharatacha Rajkiya Itihas, Diamond Prakashan Pune.

12) Gaidhani R.N., Rahulkar V.G. Prachin Bharatacha Sanskrutik Itihas Continental Prakashan Pune.

13) Sharma Ramsharan, Prachin Bharatatil Rajkiya Vichar Aani Sanstha, Diamond Publications Pune.

14) Sovni A.M. , Prachin Bharatiya Samrat, Purva Prakashan.

15) Kosambi D.D., Prachin Bharatiya Sanskruti Va Sabhyata, Diamond Publications Pune.

16) Zha D.N., Degulkar G.B., Mouryattar Va Guptakalin Rajaswa Padhhati Diamond Publications Pune.

17) Sharma R.S. (Anu. Phadake Vasanti) Prachin Bharat, K.Sagar Publications Pune.

18) Dhavalikar Gaikwad, Degulkar, Prachin Bharatacha Sanskrtik Itihas.

19) Bhide Gajanan, Prachin Bharat.

20) Mirashi V. V., Satvahan Aani Paschim kshatrap yancha Itihas Aani Koriv Lekh.

21) Dr.Rajendra Bhamare, Prof. More, Prof. Chavan, Prof. Ghadge, Prachin Bharatacha Itihas.

22) Dr.Kathare Anil, Prachin Bharatacha Itihas, Prashant Publications Jalgaon, 2012.

University of Pune

Revised S.Y.B.A. Syllabus (History, Special Paper -I)
From 2014-15
Diplomatic History of Marathas (1707-1818)

First Term

Objective:

The course intends to study the role played by the Marathas in the context of India, the changing nature of Maratha State.To understand and analyze the Maratha expansionism and its significance in various spheres.

Unit -1) Sources **10**

a) Archeological

b) Literary

c) Travellers Accounts

Unit -2) Conceptual Study of Diplomatic History of Marathas **15**

a) Swarajya b) chauth c) Sardeshmukhi d) Maratha Confederacy e) paragana f) Subha g) Baluta h) Aluta i) Gotsabha j) Bramhasabha

Unit - 3) Expansion of Maratha Power **15**

a) Background of Expansion

b) Conflict Between Chh. Shahu and Maharani Tarabai

c) The Role of Peshwa Balaji Vishwanath in Expansion of the Maratha Empire

d) Expansion of Maratha Power Southern and Northern

Unit - 4) Internal relations. **8**

a) Senapati Dabhade

b) Sarkhel Angare

c) Nagapurkar Bhosale

Second Term

Unit - 5) Batttle of Panipat **12**

a) Background b) Causes c) Effects d) Causes of Defeat

Unit - 6) Achievements of the Marathas after panipat **12**

a) Peshawa Madhavrao First

b) Barbhai Council

c) Achievements of Mahadaji Shinde

Unit - 7) Decline of the Maratha Power **12**

a) Peshawa Bajirao Second

b) Maratha - British Wars

c) Causes of Decline

Unit - 8) Maratha Administration **12**

a) Central

b) Provincial

c) Local

d) Judicial

Books for Study: English

1] James Grant Duff., History of Maharashtra, Avishkar Publishers.

2] Sardesai G.S., New History of the Marathas, Vol.I,II and III, Phoenix Publication, Bombay.

Marathi :

1. Vaidya Suman, Akhercha Peshwa, Pragati Prakashan.

2. Kelkar Y. N., Aaitihasik Povade, Diamond Prakashan, Pune

3. Sardesai B.N., Marathyancha Samajik, Arthik Va Sanskrutik Itihas (1600 te 1818) Phadke Prakashan, Kolhapur.

4. Deshpande P.N., Marathyancha Uday Aani Utkarsha (A.D. 1600 te 1761) Snehavardhan Publishing House, Pune

5. Pawar Jaysingrao, Marathi Samrajyacha Vijay Aani Asta, Mehta Publishing House Pune.

6. Shejwalkar T.S. Nijam Peshwe Sambandha 18 ve Shatak, Pune.

7. Kulkarni A. R., Nana Phadnis, Diamond Prakashan, Pune.

8. Pitre K.G., Marathyancha Yudhhetihas , 1600 te 1818, Continental Prakashan.

9. Mardikar Madan Mohan, Marathyancha Itihas, Vidya Book Publishers, Aurangabad.

10. Shindeshahi Itihasanchi Sadhane Bhag 10 Mul Kagadpatranche Sankalan va Sampadak, Kai. Anantrao Bhau Phalke Gwalior, Mukhya. Sampa. S.M. Garge, Sampa. Prof. Sadashiv Athavale.

11. (Sampa). Kulaknai- A.R., Khare G.H. (Sampa) Marathyancha Itihas Khanda 1, Continental Prakashan Pune.

12. (Sampa). Kulaknai- A.R., Khare G.H. (Sampa) Marathyancha Itihas Khanda 2, Continental Prakashan Pune.

13. (Sampa) Kulaknai- A.R., Khare G.H. (Sampa) Marathyancha Itihas Khanda 3, Continental Prakashan Pune.

14. Sahastrabuddhe P.G. Maharashtra Sanskruti.

15. Parasnis D.B., Musalman Amadanitil Marathe Sardar

16. Pagadi Setu Madhavrao, Marashtra Aani Marathe, Pune.

17. Khobarekar V.G., Maharashtracha Itihas Maratha Kalkhanda Bhag 2 Mumbai.

18. Shejwalkar, Panipat 1761.

19. Khare G.H., Dakshinchya Madhyayugin Ithihasachi Sadhane Khanda 1.

20. Khare G.H., Dakshinchya Madhyayugin Ithihasachi Sadhane Khanda 2.

21. Khare G.H., Dakshinchya Madhyayugin Ithihasachi Sadhane Khanda 3.

22. Khare G.H., Itihas Karte Marathe

23. Bhave V.K. Peshwekalin Maharashtra, Suvichar Prakashan Pune.

24. Riyasat.

25. Manjulkar, Angre Gharanyache Yogdan.

University of Pune

Revised Syllabus S.Y.B.A. (History, special Paper -II)
From 2014-2015
History of Modern Maharashtra (1818 to 1960)

First Term

Objectives:

The purpose of the course is to enable the students to study the history of modern Maharashtra .To highlight the ideas, institutions, forces and movements that contributes to the modern Maharashtra. To acquaint the students with various interpretative perspectives. To introduce the student to the regional history within a broad national framework.

Unit - 1) Conceptual Study of Modern Maharashtra **15**

1) Modernity 2) Renaissance 3) Nationalism 4) Drain of wealth 5) Moderates 6) Extremist 7) Revolutionary 8) Four Points programme of Lokmanya Tilak 9) Statyagraha 10) Democracy 11) Capitalism 12) Industrialization 13) Urbanization 14) Utilitarianism.

Unit - 2) Maharashtra in Early 19th Century **9**

a) Socio- Political & Economic background.(transition period)

b) British Administration & its Impacts.

Unit -3) Socio-Economic & Religious Reformism **12**

a) Balshastree Jambhekar

b) Jagannath Shankarsheth

c) Bhau Daji Lad

d) Gopal Hari Deshmukh (Lokhiwadi)

e) Mahatma Phule

Unit - 4) Institutional Experiments in Socio- Religious Reformism **12**

a) Paramahamsa Mandai

b) Prarthana Samaj

c) Satyashodhak Samaj

d) Arya Samaj

e) Depressed Classes Mission

Second Term

Unit - 5) Thoughts and work of Intellectuals **16**

a) Mahadev Govind Ranade

b) Gopal Ganesh Agarkar

c) Gopal Krishna Gokhale

d) Rajarshri Chatrapati Shahu Maharaj

e) Maharshi Dhondo Keshav Karve

f) Karmaveer Bhaurao Patil

g) Dr. Babasaheb Ambedkar

h) Maharshi Vitthal Ramji Shinde

Unit - 6) Contribution of Maharashtra in Indian Freedom Movement **12**

a) 1818 to 1885 (Uprising of Ramoshi, Bhills, Koli, & Deccan Riots (1875) (b) Revolt of 1857, Moderates, Extremists & Revolutionaries.

b) Non- Cooperation, Civil Disobedence & Quit India Movement

Unit - 7) Popular Movements in Maharashtra **10**

a) Non-Brahmin Movement

b) Dalit

c) Peasants

d) Workers

e) Tribals

Unit - 8) Maharashtra after independence **10**

a) Marathwada Muktisangram

b) Samyukta Maharashtra Movement

MODERN MAHARASHTRA

Book For Study : English :

1. Ballhatchet Kenneth, Social Policy and Social Change in Western India. 1817-1830, OUP, 1961.

2. Nurullah Syed and Naik J.P. A History of Education in India (During the British Period) Macmillan ana Co.Ltd. Bombay,1951.

3. Paranjpe Shrikant, Dixit Raja and Das C.R. Western India : History Society and Culture, Itihas Shikshak Mahamandal, Maharashtra, Pune-1997.

4. Ravindra Kumar, Western India in the Nineteenth Century : A Study in the Social History of Maharashtra Routledge and Kegan Paul, Toronto, 1968.

Marathi:

1. (Sampa). Dharmadhikari A.B., Maharashtratil Samaj Sudhark, Chanakya Mandal Pariwar Prakashan, Pune.

2. Kir Dhananjay, Mahatma Jyotirao Phule :Aamachya Samaj Krantiche Janak, Popular Prakashan, Mumbai.

3. Phadake Yashwant Dinkar, Visavya Shatakatil Maharashtra, 1901 te 1914 Khand 1 La Shri Vidya Prakashan Pune.

4. Sardesai B.N. Adhunik Maharashtra, 1898-1960 Phadake Prakashan, Kolhapur.

5. Garud Annasaheb, Sawant B.B., Maharashtratil Samajsudharnecha Itihas 1819 te 1950, Kailas Publications Aurangabad.

6. Kulkarni Shilpa, Maharashtrache Samajshastra, Diamond Prakashan, Pune.

7. Dixit Raja, Ekonisavya Shatakatil Maharashtra Madhyam Vargacha Uday, Daimond Prakashan, Pune

8. Adhunik Maharashtratil Vargajati Prabodhan, Bagade, Umesh.

9. Chausalkar. Ashok, Maharshi Vitthal Ramji Shinde, Lokvangmay Griha Prakashan.

10 Bhole Bhaskar Laxman, Mahatma Jyotirao Phule Vaarasa Aani Vasa, Saket Prakashan.

11. Sardar G.B. Mahatma Phule Vyaktitwa Aani Vichar, Granthali Prakashan.

12. Atre Shubhangana, Maharashtra Sanskriti, Daimond Prakashan, Pune

13. Mangudkar M.P., Maharashtratil Samaj Prabodhan Aani Chhatrapati Shahu Maharajanche Karya, Pune Vidyapith Prakashan, Pune.

14. Patil V.B. Maharashtratil Samaj Sudharnecha Itihas, Mehta Publishing House.

15. Pawar Jaysinghrao, Rajarshri Shahu Smarak Grantha, Maharashtra Itihas Prabodhini, Kolhapur.

16. Phadkule Nirmal, Lokhitwadi Kal Aani Kartutwa, Continental Prakashan, Pune.

17. Priyolkar A.K., Dr. Bhau Daji Vyakti Kal Va Kartutwa, Mumbai Marathi Sahitya Sangha.

18. Sardar G.B., Adhunik Maharashtrache Upekshit Mankari., Pune.

19. Bhalerao Anant, Marathewadyacha Swatyantra Sangram.

20. More Sadanand, Lokmanya te Mahatma.

21. Sahastrabuddhe P.G., Lokhitwadinchi Shatpatre, Continental Prakashan, Pune.

22. Narke Hari Phadke, Y.D. Mahatma Phule Gaurav Grantha, Maharashtra Rajya Shikshan Vibhag, Mumbai.

23. Ranade G.M., Maharashtratil Samaj Vichar A.D.1818 te 1878, Suvichar Prakashan Mandal, Nagpur Pune.

24. Valimbe R.S., Arvachin Maharashtrachi Samajik Punarghatana.

25. Pan. Nalinee, Maharashtratil Rashtravadacha Vikas, Modern Book Depot, Pune.

26. (Sampa.) Vora Rajendra, Adhunikta Aani Parampara, 19 vya Shatakatil Maharashtra Pratima Prakashan, Pune.

27. Sardar G.B. , Arvachin Marathi Gaddyachi Purva Pithika, Modern Book Depot, Pune

28. Bedekar D.K., Bhanage B.S., Bharatiya Prabodhan.

29. Patil V. B., 19 vya Shatakatil Maharashtratil Samaj Sudharnecha Itihas, K. Sagar Publications, Pune.

30. Acharya Javdekar S.D., Adhunik Bharat, Continental Prakashan, Pune

31. Kulkarni P.B., Nana Shankarsheth yanche Charitra Kal va Kamgiri, Mumbai.

32. Ketkar Kumar, Katha Swatantryachi, Maharashtra, Pune.

33. Garge S.M., Gopal Ganesh Agarkar,, National Book Trust, India New Delhi.

34. Nanda Balram (Anu.) , Vasant Palshikar, Gopal Krishna Gokhale, British Rajwat va Bharatiya Nemasta Yug, Pune.

35. Phatak N. R. Justice Mahadev Govind Ranade yanche Charitra, Nilkanth Prakashan, Pune.

36. Bhole Bhaskar Laxman, Bharatiya Rajkiya Vicharvant..

37. Tilekar Arun (Sampa.) , Maharashtra Charitra Granthamala Sancha 61 Charitra Grantha, Gandharva Ved Prakashan, Pune.

38. Dr. Kathare Anil, Adhunik Maharashtracha Itihas, Vidya Books Publishers, Aurangabad, Dwitiya Avrutti 2013.

39. Dr. Kathare Anil, Maharashtratil Samaj Sudharak, Vidya Books Publishers, Aurangabad, 2014.

University of Pune

Revised Syllabus S.Y.B.A. (History, Special Paper - II)
From 2014-15
Medieval India - (1206-1707)

First Term

Objectives:

To survey the sources of History of medieval India. The course intends to provide an understanding of the social, economic, religious bases of medieval India. To Study medieval Indian art & architecture.

Unit - 1) Sources of Medieval Indian History **8**

a) Archaeological

b) Literary

Unit - 2) Conceptual study of Medieval India **16**

a) Medievalism

b) Kingship

c) Saranjamshahi

d) Mansabdari (Rank)

e) Jizyah

f) Hundi

g) Chhalisgani organization /Turkan - I chahlghani

h) Sulah - I - kul

i) Madad - I - mash

j) Din - I - Elahi

k) Sufism

l)Bhakti cult

m) Ikta

n) Shahna - I - mandi

o) Khalifa

Unit - 3) Delhi Sultanate **12**

a) Political background of Delhi sultanate

b) Turkish rulers

c) Khilji - Administration, military system, Economic reformations.

d) Experiments of Mohammad-Bin-Tughluq.

e) Decline of sultanate

Unit - 4) Delhi sultanate: Socio- Economic, & religious life. **12**

a) Social life, Social Structure, position of women

b) Economic life, Agriculture, trade and industry

c) Religious life: Bhakti movement, suficult

d) Art & Architecture

e) Science & Technology.

Second Term

Unit - 5) Deccani powers (southern states) **12**

a) Yadav : Administration and socio-economic

b) Vijaynagar : Administration and socio-economic

c) Bahamani : Administration and socio-economic

Unit - 6) The period of Mughals **12**

a) Political background

b) Reforms of Shershah

c) Mughal administration

1) Central

2) Provincial

d) Land revenue & manasbdari

Unit - 7) Socio-economic & cultural life of Mughals **12**

a) Social

b) Religious

c) Economic

d) Art & architecture

e) Science & Technology

Unit - 8) Relation between Mughal & Regional states **12**

a) Rajputs

b) Sikh

c) Nijamshahi

d) Adilshahi

e) Marathas

Books for Study : English

1] Mehta J.L., Advanced study in the history of medieval India, sterling Publishers Pvt.Ltd.

2] Varma Nirmala, History of India Mughal Period, ABCD Publishers.

3] Singh Meera, Medieval History of India, Vikas Publishing House Pvt.Ltd.

4] Mukhia Harbans, Perspectives on medieval history, Vikas Publishing House Pvt.Ltd.

5] Tarachand, Influence of Islam on Indian Culture, Delhi.

6] Fukazawa Hiroshi, the Medieval Deccan, Peasant, Social System & Status

7] Shastri, Nilkantha K.A. History of India Culture, Delhi

8] Mahajan V.D. History of India, Madras

9] Irfan Habib, Delhi Sultanate

10] Lanepule Stanley, Medieval India

11] Percy Brown - Art & Architecture, Islamic Architecture

12] Satishchandra- History of Medieval India, Orient Blackswan, Hyderabad.

13] Neeraj Srivastava-Madyakallen Bharat- Prashasan, Samaj Evam Sanskriti Orient Blackswan, Hyderabad

14] Upinder Singh, A History of Ancient and Early Medieval India, Pearson, Delhi.

15] Piyush Chauhan, A History of India (From Early Times to A.D.1206) Pearson, Delhi.

16] Salma Ahmed Farooqui, A Compressive History of Medieval India, Pearson, Delhi.

Marathi :

1. Dr. Muhammad Ajam, Sufi Tatwadnyan : Swaproop Aani Chintan, Padmagandha.

2. L.Siddikhi N.A., (Anu.) Dr. Saswadkar P.L., Mogalkalin Mahasul Paddhati, Diamond Prakashan, Pune.

3. Chitnis K.N., Madhyaygin Bharatiya Sankalpana va Sanstha Bhag 1 te 4, Allrich Enterprises, Mumbai

4. Kulkarni V.V., Nevaskar Ashok Madhyayugin Bharatacha Itihas A.D.1206 te 1658, Vidya Prakashan, Nagpur.

5. L.Jadunath Sarkar (Anu.), Kolarkar S.G., Aurangjeb, Diamond Prakashan Pune.

6. Dixit N.S., Prachin va Madyayugin Bharat Prarambhapasun te A.D. 1707. Pimpalapure & Co. Publishers, Nagpur.

7. Phadnaik Chandrashekhar, Prachin va Madhyayugin Bharat, Vidya Prakashan, Nagpur.

8. Banahatti Rajendra, Akbar te Aurangjeb, Diamond Publication Pune.

9. Kogekar Sunanda, Akabarkalin Hindustan, Diamond Publication Pune.

10. Joshi Smita, Bharatiya Itihas Prachin te Arvachin, Diamond Publication Pune.

11. Bhide Gajanan, Nalavade Vijay, Naiknavare, Madhyayugin Bharat, Phadake Prakashan, Kolhapur.

12. Sardesai G.S., Musalmani Riyasat, Popular Prakashan, Mumbai.

13. Mate M.S., Chavan Kamal, Madhyayugin Kalabharati, Continental Prakashan, Pune.

14. Athaley Vibha, Prachin va Madhyayugin Bharat.

15. Chandra Satish, Madhyayugin Bharat, Jawahar Publishers, New Delhi.

16. Dr. Kathare Anil, Madhyayugin Bharatacha Itihas, Prashant Publications, Jalgaon,2013

17. Acharya Apte, Madhyayugin Bharat.

Hindi:

1. Irfan Habib (Sampa.), Madhyakalin Bharat, Ank 1 te 5, Rajkamal Prakashan, New Delhi.

2. Irfan Habib(Sampa.), MadhyaKalin Bharat, Ank 2, Rajkamal Prakashan, New Delhi.

3. Irfan Habib(Sampa.), MadhyaKalin Bharat, Ank 3, Rajkamal Prakashan, New Delhi

4. Irfan Habib(Sampa.), MadhyaKalin Bharat, Ank 4, Rajkamal Prakashan, New Delhi

5. Irfan Habib(Sampa.), MadhyaKalin Bharat, Ank 2, Rajkamal Prakashan, New Delhi

6. Varma Harishchandra (Sampa.), Madhyakalin Bhar, Bhag 1, 750, 1540 Hindi Madhyam Karyanvay Nideshalaya, Delhi Vishwavidyala, Delhi.

University of Pune

History of Civilization : Indian Culture

Revised Syllabus, S.Y.B.A. G-II

First Term

1. Unit I- Introduction to Indian Culture **10**
   - 1.1. Physical and Geographical Features of India
   - 1.2. Defining the term culture
   - 1.3. Features of Indian Culture
2. Unit II- Ancient Indian Culture **12**
   - 2.1. Sources- Archeological, Inscriptional, Literary
   - 2.2. Palaeolithic and Neolithic Culture
   - 2.3. Harappan Culture
   - 2.4. Late Harappan Culture
   - 2.5. Dravidian Culture
3. Unit III- Main Religions: Philosophy and Teaching **12**
   - 3.1. Hinduisim
   - 3.2. Jainism
   - 3.3. Buddhism
   - 3.4. Sikhism
4. Unit IV- Indian Culture- 400 BC to 600 AD **8**
   - 4.1. Cultural Contribution of Ashokan Age
   - 4.2. Cultural Contribution under the Gupta Age
5. Unit V- Ancient Indian Science **6**
   - 5.1. Mathematics
   - 5.2. Astronomy
   - 5.3. Medicine

Second Term

6. Unit VI – Language and Literature **10**
   - 6.1. Indo-Aryan Languages- Origin and Phases of Development
   - 6.2. Dravidian – Origin and Phases of Development
   - 6.3. Forms of Literature- Sanskrit, Prakrit, Apabhraunsh and Vernacular Languages
7. Unit VII- Arts **10**
   - 7.1. Sculpture- Caves, Pillars and Temples- Buddhist, Jain, Hindu and Muslim
   - 7.2. Paintings- Caves, Temples- - Buddhist, Jain, Hindu and Muslim
   - 7.3. Music- Classical- Hindustani and Karnatik
     - 7.3.1. Folk Music
8. Unit VIII- Architecture **10**
   - 8.1. Buddhist
   - 8.2. Hindu

8.3. Muslim
8.4. Colonial

9. Unit IX- Bhakti Movement **8**
   9.1. Shaiva
   9.2. Vaishnav
   9.3. Sufism
   9.4. Sikhism
10. Unit X- Socio Religious Reform Movements **10**

   10.1. Brahmo Samaj
   10.2. Arya Samaj
   10.3. Ramkrishna Mission
   10.4. Satyashodhak Samaj

English Reading List -

1. Basham A .L, Wonder that was India, Oxford University press. 1954
2. Basham A .L., Cultural history of India, Oxford University press, 1975. (Translation available in Marathi)
3. Brown Percy , Indian Architecture, (Buddhist and Hindu period), D. B. Taraporewalla & Co. Bombay, 1965.
4. Mujumdar R.C., Raichudhury N.C. and Kalikinkar Datta, - An Advanced History India, Mcmillan India,1973. (Translation available in Marathi)
5. Razvi S.A.A, Wonder that was India, Vol-2, South Asia Books, 1996.
6. Sen Shailendra Nath, A Textbook of Indian History and culture, Mcmillan India ,1998.
7. Thapar Romila, India :From the origins to AD 1300, Penguin. (Translation available in Marathi)

Marathi Reading List-

1. Aatre Trimbak Narayan,* Gaav Gaadaa*, Samanvay Prakashan, Kolhapur, 2012.
2. Dhavalikar Madhukar Keshav,* Maharashtrachi Kulkatha*, Rajhans Prakashan, Pune.
3. Gokhale Shobhana, *Bharatache Sanskriti Vaibhav*, Diamond Publications,Pune, 2009.
4. Gokhale Shobhana, *Purabhilekhavidya*, (2nd Edition), Continental Prakashan, Pune, 2007.
5. Joshi Laxman Shastrai, Vaidik Sanskruteecha Vikas,
6. Kosambi Damodar Dharmanand, (tr. Vasant Tulpule), *Puranakatha Ani Vastavata,* Lokvangmay Gruha Prakashan, Mumbai, 2007.
7. Sankrityayan Rahul, (tr. V. S. Vakeel),*Volga te Ganga*,(10th Edition) Lokvangmay Gruha Prakashan, Mumbai, 2006.

SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE.

POLITICAL SCIENCE

Syllabus for TYBA

80:20 Pattern to be implemented from 2015-16

General Course

Paper No	Paper Title
G - 3	Political Ideologies
	OR
G - 3	Local Self Government In Maharashtra

Special Course

S - 3	Public Administration
S - 4	International Politics

SYLLABUS FOR TYBA POLITICAL SCIENCE (G-3)

POLITICAL IDEALOGIES

Course Rationale:

This paper studies the role of different political ideologies and their impact in politics. Each ideology is critically studied in its historical context. In course of its evolution and development, the different streams and subtle nuances within each ideology, the changes and continuities in its doctrine and its relevance to contemporary times are highlighted. The close link between an idea and its actual realization in public policy needs to be explained as well. The philosophical basis of the ideologies is emphasized with special emphasis on key thinkers and their theoretical formulations. The legacy of all the major ideologies is to be critically assessed.

SECTION-I

UNIT-I: - Ideology **08**

a) Origin, Meaning, Definition
b) Nature and Scope

UNIT-II: - Nationalism **14**

a) Meaning, Definitions and Elements
b) Progressive and Reactionary
c) Internationalism

UNIT-III: - Democratic Socialism **14**

a) Meaning, Nature and Features
b) Achievements and Limitations
c) Types : Febianism, Syndicalism, Guild Socialism

UNIT-IV: - Fascism **12**

a) Factors responsible for the rise of Fascism
b) Principles
c) Corporate State

SECTION-II

UNIT-V: - Marxism **12**

a) Historical Materialism
b) Theory of Surplus Value
c) Marxian State

UNIT-VI: - Phule-Ambekarism **12**

a) Equality
b) Religion
c) Democracy

UNIT-VII: - **Gandhism** **12**

a) Truth and Non-Violence
b) Theory of Satyagraha
c) Gram Swaraj

UNIT-VIII: - **Feminism** **12**

a) Meaning and Nature
b) Liberal Feminism
c) Feminism in India : Caste, Patriarchy, Women's Representation

Readings:

L. P. Baradat, Political Ideologies: Their Origins and Impact, Englewood Cliffs NJ, Prentice Hall, 1989.
. ————, The Liberal Tradition in China, Hong Kong and New York, Chinese University of Hong Kong Press, 1983.
D. Bell, The End of Ideology, New York, The Free Press, 1960.
R. N. Berki, Socialism, London, John Dent and Sons, 1975.
Sir I. Berlin, "Nationalism: Past Neglect and Present Power" in H. Hardy (ed.) Against the Current, Oxford, Oxford University Press, 1981.
J. Bondurant, Conquest of Violence: the Gandhian Philosophy of Conflict, Berkeley, University of California Press, 1965.
R. M. Christenson, et al., Ideologies and Modern Politics, London, Thomas Nelson and Sons, 1971.
P. Gay, The Dilemma of Democratic Socialism: Eduard Bernstein's challenge to Marx, New York, Columbia University Press, 1952.
E. Gellner, Nations and Nationalism, Oxford, Blackwell, 1983.Political Science 76 J. Gray, Liberalism, Minneapolis, University of Minnesota Press, 1986.
J. Gray, Liberalisms: Essays in Political Philosophy, London, Rout ledge, 1989.
D. Ingersoll and R.K. Mathews, The Philosophic Roots of Modern Ideologies: Liberalism, Communism and Fascism, Englewood Cliffs NJ, Prentice Hall, 1991.
R. N. Iyer, The Moral and Political Thought of Mahatma Gandhi, New York, Oxford University Press, 1973.
M. Kitchen, Fascism, London, Dent, 1979.
D. J. Manning, Liberalism, London, John Dent and Sons, 1976.
H. C. Mansfield, The Spirit of Liberalism, Cambridge, Harvard University Press. Political Science 77
D. McLellan, Marxism after Marx, London, Macmillan, 1975.
————, On Nationality, Oxford, The Clarendon Press, 1995.
Dr.Lodhi Kaniz Fatma Niyaz Ahmed, Modern Political Ideologies, Success Publication, Pune, 2015.
Dr. Benke Suvarna, Political Theory (Marathi), Peasant Publication, Jalgaon, 2014.
Dr. Chavan Shankar, Modern Political Ideology (Marathi), Pratima Prakashan, Pune.
Dr. Devare P.D., & Dr. D.S. Nikumbh, Modern Political Ideologies (Marathi), Prashant Publication, Jalgaon, 2008.
Dr. Date Sunil & Dr. Dhobale Ramesh, Political Ideologies (Marathi), Vidya Book Publishers, Aurangabad, 2009.
Dr. Rathi Shubhangi, Modern Political Ideologies (Marathi), Atharva Publication, Jalgaon, 2014.
Kulkarni A.N., Modern Political Ideologies, Vidya Prakashann Nagpur, 2014

OR

SYLLABUS FOR TYBA POLITICAL SCIENCE (G-3)

LOICAL SELF GOVERNMENT IN MAHARASHTRA

Objectives :-

The content of this course are designed with following objectives.

1) To introduce the students to the structure of Local Self Government of Maharashtra.
2) To make students aware of the various Local Self Institutions, their functions, compositions and importance.
3) To identity the role of Local Government and Local Leadership in development.

SECTION-I

UNIT-I: - Evolution of Local Self Government **10**

a) Pre-Independence Period : British Period
b) Post-Independence Period **:**Community Development Programme, Balwantrai Mehta Committee**.**

UNIT-II: - Various Committees of Local Self Government in Maharashtra **12**

a) Vasantrao Naik Committee
b) L. N. Bongirwar Committee
c) Prin. P. B. Patil Committee

UNIT-III: - 73rd and 74th Amendments **12**

a) 73rd Amendment
b) 74th Amendment
c) Importance

UNIT-IV: - **Rural Local Bodies : Composition, Power and Functions** **14**

a) Gram Sabha and Gram Panchayat
b) Panchayat Samiti
c) Zillah Parishad

SECTION-II

UNIT-V: - Urban Local Bodies: Composition, **Power and Functions** **14**

a) Nagar Panchayat
b) Municipal Council
c) Municipal Corporation

UNIT-VI: - State Election Commission **12**

a. Structure, Power and Functions
b. Election Reforms

UNIT-VII: - **Role of Leadership in Development** **12**

a) Emerging patterns of Leadership
b) Impact of leadership on development

UNIT-VIII: - **Challenges before Local Self Government** **10**

a) Issues in local finance
b) Issues of participation

Reference Books :-

1. Maheshwari S. R., Local Self Government in India, Orient Longman, 1971.
2. Avasthi A. (ed.), Municipal Corporation in India, L. N. Agarwal, Agra, 1972.
3. Sharma M.P., Local Self Government in India, Munshiram Manoharial, New Delhi, 1978.
4. Inamdar N.R., Educational Administration in the Zillah Parishad in Maharashtra, Popular Publication, Mumbai, 1974.
5. Venkatesan V., Institutionalising Panchayati Raj in India, Institute of Social Sciences, New Delhi, 2002.
6. Dr. Khandve Eknath, Government and Politics of Maharashtra (Marathi), Pearson Publication, Delhi, 2013.
7. Birajdar T.S. & Dr. Ghodake Sharad, Local Self Government in India (Marathi), Anshul Prakashan, Nagpur, 1999.
8. Dr. Shirsath Shyam and Bainade, Panchayati Raj and Urban Development (Marathi), Vidya Books, Aurangabad, 2014.
9. Dr. Rathi Shubhangi, Socio-political Movement and Aministration in Maharashta (Marathi), Atharv Publication, Jalgaon, 2014.
10. Bang K.R. Local Self Government in India : Special reference to Maharashtra(Marathi), Mangesh Prakashan, Nagpur, 2005.
11. Dr. Nalawade Pandit, Decentralization of Power and 73rd Constitutional Amendment (Marathi), Chinmay Publication, Aurangabad, 2008.
12. Aawale Manoj, Local Self Government in India (Marathi)

SYLLABUS FOR TYBA POLITICAL SCIENCE (S-3)

PUBLIC ADMINISTRAION

Course Rationale:

This paper is an introductory course in Public Administration. The essence of Public Administration lies in its effectiveness in translating the governing philosophy into programmes, policies and activities and making it a part of community living. The paper covers personnel public administration in its historical context thereby proceeding to highlight several of its categories, which have developed administrative salience and capabilities to deal with the process of change. The recent developments and particularly the emergence of New Public Administrations are incorporated within the larger paradigm of democratic legitimacy. The importance of legislative and judicial control over administration is also highlighted

SECTION-I

UNIT-I: - **Public Administration** **12**

a) Meaning
b) Nature
c) Scope and Significance

UNIT-II: - New Public Administration **12**

a) Evolution
b) Salient Features
c) Goals

UNIT_III:- Approaches to Public Administration. 12

a) Traditional Approach
b) Behavioral Approach
c) System Approach

UNIT-IV: - **Governance** **12**

a) Idea of Good Governance
b) E-Governance
c) Public Private Partnership

SECTION-II

UNIT-V:- Bureaucracy **12**

a) Meaning and Definitions
b) Administrative Reforms

UNIT-VI: - **Personnel Administration** **12**

a) Recruitment
b) Training
c) Promotion

UNIT-VII: - **Budget** **12**

a) Meaning and types
b) Budgetary Process in India

<u>UNIT-VIII</u>: - **Accountability and Control** **12**

a) Administrative Accountability
b) Legislative Control
c) Judicial Control

Readings:

1. P. H. Appleby, Policy and Administration, Alabama University of Albama Press, 1957.
2. A. Avasthi and S. R. Maheswari, Public Administration, Agra, Lakshmi Narran Aggrawal, 1996.
3. D. D. Basu, Administrative Law, New Delhi, Prentice Hall, 1986.
4. C. P. Bhambri, Administration in a Changing Society: Bureaucracy and Politics in India, Delhi, Vikas, 1991.
5. M. Bhattacharya, Public Administration: Structure, Process and Behavior, Calcutta, The World Press, 1991.
6. M. E. Dimock and G. O. Dimock, Public Administration, Oxford, IBH Publishing Co., 1975.
7. ———— Administrative Vitality: The Conflict with Bureaucracy, New York, Harper, 1959.
8. E. N. Gladden, The Essentials of Public Administration, London, Staples Press, 1958.
9. S. R. Maheshwari, Administrative Theories, New Delhi, Allied, 1994.
10. S. R. Nigam, Principles of Public Administration, Allahabad Kitab Mahal, 1980.
11. F. A. Nigro and L.S. Nigro, Modern Public Administration, New York, Harper and Row, 1984.
12. O. Glenn Stahl, Public Personnel Administration, New York, Harper & Brothers, 1956.
13. D. Waldo (ed), Ideas and Issues in Public Administration, New York, Mc Graw Hill, 1953.
14. N. D. White, Introduction to the Study of Public Administration New York, Macmillan, 1955
15. M Laxmikanth, Public Adminstration, , New Delhi ,Mc Graw Hill,2012
16. Avasthi Amreshwar, Maheshwari Shriram, (1982) Public Administration, Lakshmi Narran Aggrawal, Agra – 3
17. Bhagwan Vishnu, Bhushan Vidya (2007), Public Administration, S Chand and Company Ltd, New Delhi
18. Dr.Benke Suvarna (2015), *Public Administration (Marathi),* Peasant Publication, Jalgaon, 2015.
19. Dr.Arjun Darshankar (2000), Panchayat Raj aani Nagari Prashan, Kailas Prakashan, Aurangabad, 4th Edition.
20. Patil V B, *Lok Prashasan*, Shri Mangesh Prakashan, Nagpur
21. Rumki Basu, (2004) Public Administration: Concepts and Theories, Sterling Publication, Delhi.
22. Bhogale Shantaram, (2006) *Lokprashasanache Siddhant aani Kaeryapadhati*, Kailas Prakashan, Aurangabad.
23. Patil B. B., *Public Administration (Marathi),* Phadake Prakashan, Kolhapur, 2004.

SYLLABUS FOR TYBA POLITICAL SCIENCE (S-4)

INTERNATIONAL POLITICS

Course Rationale:

This paper deals with concepts and dimensions of international relations and makes an analysis of different theories highlighting the major debates and differences within the different theoretical paradigms. The dominant theories of power and the question of equity and justice, the different aspects of balance of power leading to the present situation of a unipolar world are included. It highlights various aspects of conflict and conflict resolution, collective security and in the specificity of the long period of the post Second World War phase of the Cold War, of Détente and Deterrence leading to theories of rough parity in armaments.

SECTION-I:

UNIT I :- International Politics **12**

a) Nature and Scope
b) Theories of Idealism and Realism

UNIT II :- Approaches to the Study of International Relations **12**

a) Power Approach
b) Decision Making Approach
c) System Approach

UNIT III :- Power **12**

a) Meaning
b) Elements
c) Changing Nature of the National Power

UNIT IV :- Balance of Power **12**

a) Meaning and Nature
b) Characteristics
c) Changing Nature of the Balance of Power

SECTION –II

UNIT V :- Security **12**

a) Meaning and definition
b) Regional Security
c) Collective Security

UNIT VI :- Diplomacy **12**

a) Meaning
b) Types of Diplomacy
c) Challenges To Diplomacy

UNIT VII :- Disarmament **12**

a) Meaning and Nature
b) Types of Disarmament
c) Issues and Challenges

UNIT VIII :- Issues in International Politics **12**

a) Human Rights –Its variations and Measures
b) Terrorism – Causes and Consciousness

Readings:

D. A. Baldwin (ed.), Neo-realism and Neo-liberalism, New York, Columbia University Press, 1993. (ed.), Paradoxes of Power, New York, Basil Blackwell, 1989.

J. C. Bennett (ed.), Nuclear Weapons and the Conflict of Conscience, New York, Charles Scribner's Sons, 1962.

D.G. Brennan (ed.), Arms Control, Disarmament and National Security, New York, George Braziller, 1961.

H. Bull, The Control of the Arms Race, New York, Praeger, 1961.

K von Clausewitz, War, Politics and Power: Selections, Chicago, Henry Regnery Company, 1962.

W. D. Coplin, Introduction to International Politics, Chicago, Markham, 1971

K. Deutsch, The Analysis of International Relations, Englewood Cliffs NJ, Prentice Hall, 1967. J. E. Dougherty, How to think about Arms Control and Disarmament, New York, Alfred A. Knopf, 1962

R. L. Pfaltzfraff, Jr., Contending Theories of International Relations, Philadelphia, J.B. Lippincott Co., 1970.

W. Epstein, Disarmament: 25 years of Effort, Toronto, Canadian Institute of International Affairs, 1971. The Last Chance: Nuclear Proliferation and Arms Control, New York, The Free Press, 1976.

R. A. Falk, Law, Morality and War in the Contemporary World, New York, Frederick A Praegar, 1963

H. W. Forbes, The Strategy of Disarmament, Washington DC, Public Affairs Press, 1962.

J. Galtung, The True Worlds: A Transnational Perspective, New York, The Free Press, 1980.

F. I. Greenstein and N. W. Polsby, Theory of International Relations, Reading Massachusetts, Addison-Wesley, 1979.

K.J. Holsti, Why Nations Realign, London, Allen and Unwin, 1982.

————, The Dividing Discipline, Boston, Allen and Unwin, 1985.

————, Peace and War: Armed Conflicts and International Order 1648-1989, Cambridge, Cambridge University Press, 1991.

A. Hurrell, "Collective Security and International Order Revisited" International Relations, Vol. II, No.1, April.

. R. O. Keohane, After Hegemony: Cooperation and Discord in the World Political Economy, Princeton NJ, Princeton, University Press, 1984.

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————, International Institutions and State Power, Boulder Colorado, Westview Press, 1989. ———— and E. Ostrom (eds.), Local Commons and Global Interdependence: Heterogeneity and Co-operation in Two Domains, London, Sage, 1994.

S. D. Krasner (ed.), International Regimes, Ithaca NY, Cornell University Press, 1983.

Political Science 23 H. D. Lasswell, World Politics and Personal Insecurity, New York, McGraw-Hill Book Company, 1953.

H. J. Morgenthau, Politics Among Nations, 6th edition, revised by K. W. Thompson, New York, Alfred Knopf, 1985.

J. A. Vasquez, The Power of Power Politics, London, Frances Pinter, 1983.

K. N. Waltz, Theory of International Politics, Reading Massachusetts, Addison-Wesley, 1979.
————, "The emerging structure of International Politics", International Security, 18, 1993, pp. 44-79.
A. Wolfers, Discord and Collaboration, Baltimore, Johns Hopkins University Press, 1962

Dr. Raipurkar Vasant, International Relations (Marathi), Mangesh Prakashan Nagpur, 2009.
Dr. Amrutkar Prashant, Theory of International Relations (Marathi), Chinmay Publication, Aurangabad, 2014.
Dr.Pendase Aruna and Uttara Sahashrabhudhe, International Relations (Marathi), Orient Longman Pvt. Ltd., Mumbai.
Dr. Deolankar, Shailendra – International Relations (Marathi), Vidya Books, Aurangabad, 2004.

SAVITRIBAI PHULE PUNE UNIVERSITY , PUNE

PUBLIC ADMINISTRATION

Syllabus for TYBA

80:20 Pattern to be implemented from 2015-16

General Course

Paper No	Paper Title
G -3	Institutions and Issues in Indian Administration

Special Course

S - 3	Administrative Thinkers
S - 4	Development Administration

SYLLABUS FOR TYBA - PUBLIC ADMINISTRATION (G-3)

INSTITUTIONS AND ISSUES IN INDIAN ADMINISTRATION

Objectives:-

1. To introduce the students to the structure of Indian Administration.
2. To make students aware of the various issues related to the institutional behavior of Indian Administration.
3. To acquaint the students with concept of governance and its increasing significance in the era of globalization.

SECTION-I

UNIT I: - Bureaucracy **12**

a) Civil Services: All India services, Central Services, State Services.
b) Recruiting Agencies (structure and function)
   i. Union Public Service Commission
   ii. State Public Service Commission
c) Training
   i. Nature of Indian Training System
   ii. Indian Institute of Public Administration, New Delhi
   iii. Lalbhadur Shastri Academy of Administration, Dehradun
   iv. Administrative Staff College, Hyderabad

UNIT II :- Public Finance **12**

a) Meaning and Significance
b) Budget
c) Control Over Finance
   i. Ministry of Finance
   ii. Committee on Public Undertaking
   iii. Public Account Committee
   iv. Estimate Committee

UNIT III: - Machinery for Planning **12**

a) Planning Commission of India
b) National Development Council
c) State Planning Commission

UNIT IV: - **Voluntary Agencies** **12**

a) Meaning and Structure
b) Functions and Importance
c) Role of Voluntary Organizations

SECTION-II

UNIT V: - **Governance** **12**

a) Meaning
b) Significance
c) Devices

UNIT VI: - Law and Order **12**

a) Department of Law Affairs
b) Central Reserve Police
c) State Reserve Police

UNIT VII: - **Welfare Administration** **12**

a) Reservation Policy and Social Justice
b) National Human Rights Commission
c) National Women Commission

UNIT VIII: - **Recent Issues** **12**

a) Relationship between Political and Permanent Executive
b) Integrity in Administration : Lokpal and Lokayukta
c) Liberalization, Privatization and Globalization

Readings :

1. Sing Hoshiar, Indian Administration, Kitab Mahal, Delhi, 2001.
2. Prasad Kamala, Indian Administration : Politics, Policies and Prospects, Dorling Kindersley India Pvt. Ltd., Delhi, 2006.
3. Maheswari S.R., Indian Administration, Orient Blackswan, New Delhi, 6th Edition, 2009.
4. Bhatnagar P.S., Indian Administration: Issues and Options, Mangal Deep Publication, Jaipur, 2003.
5. Ahmed Nassem, Indian Public Administration, Anmol Publication, New Delhi, 2005.
6. Fadiya B.L., Indian Administration (Hindi), Sahitya Bhawan Publication, Agra 2000.
7. Patil B.D., Development Administration (Marathi), Vidya Prakashan,Nagpur.

SYLLABUS FOR TYBA - PUBLIC ADMINISTRATION (S-3)

ADMINISTRAITIVE THINKARS

Objectives:-

1. To acquaint the students with the main administrative ideas of major administrative thinkers.
2. To make the students aware of the contributions made by thinkers to the administrative thinking.

SECTION-I

UNIT-I: - Kautilya **12**

a) Principles of Administration
b) Machinery of Administration
c) Administrative Corruptions

UNIT-II: - F. W. Taylor **12**

a) Concept and Objectives of Scientific Management
b) Principles and Impacts of Scientific Management
c) Critical Evaluation

UNIT-III: - Woodrow Wilson **12**

a) Views on Administration
b) Dichotomy between Administration and Politics

UNIT-IV: - Max Weber **12**

a) Views on Authority, Organization and Legitimacy
b) Weberian Model of Bureaucracy

SECTION-II

UNIT-V: - Chester Barnard **12**

a) Views on Organization
b) Theory of Authority
c) Functions of Executive

UNIT-VI: - Pandit Nehru **12**

a) Views on Bureaucracy
b) Decentralization
c) Socialism and Administration

UNIT-VII: - Herbert Siman **12**

a) Views on Traditional Administration
b) Views on Behaviouralism
c) Decision Making Model

UNIT-VIII:- F. W. Riggs **12**

a) Ecological Approach
b) Structural – Functional Approach
c) Diffracted – fused Prismatic Society and SALA Model

Readings : -

1. Ali Slim-sum Nila, Eminent Administrative Thinkers, Associated Publishing House, New Delhi, 1984.
2. Maheshwari S.R., Administrative Thinkers, Macmillan India Ltd., Mumbai, 1998.
3. Prasad Ravindra and others, Administrative Thinkers, Sterling Publishers, New Delhi, 1980. (Marathi translation- Phadake V.Y., K Sagar Publication, Pune)
4. Mukhi H. R., Administrative Thinkers, SDB Publishers, New Delhi.
5. Joshi and Parikh, Administrative Thinkers, Ravat Publicatins, Jaypur, 1999.
6. Kottapalle Laxman, Western and Indian Administrative Thinkers (Marathi), Nirmal Prakashan, Nanded.
7. Dr. Shirsath Sham and others, Administrative Thinkers (Marathi), Dnyansemidha Publishing, Aurangabad.
8. Dr. Naik Nandakumar, Administrative Thinkers (Marathi), Vidya Books, Aurangabad, 1999.
9. Prasad D. Ravindra, Administrative Thinkers (Marathi), K Sagar Publishers, Pune, 2011.
10. Kottapalle Laxman, Modern Administrative Thinkers, Kalpana Prakashan, Nanded, 1991.

SYLLABUS FOR TYBA - PUBLIC ADMINISTRATION

DEVELOPMENT ADMINISTRATION (S-4)

Objectives :

1) To acquaint the student with the concept of Development Administration.
2) To highlight the role of the Administration in Development.

SECTION-I

UNIT I: - Development Administration **12**

a) Meaning , Nature and Scope
b) Significance and Features
c) Public Administration and Development

UNIT II:- New Strategy of Development **12**

a) Central Level Planning (NITI)
b) State Level Planning
c) District Level Planning

UNIT III:- Social Welfare in India **12**

a) Concept and Meaning
b) Importance
c) Dimensions

UNIT IV:- Challenges before Development Administration **12**

a) Regionalism
b) Corruption
c) Population Explosion

SECTION-II

UNIT VI:- Bureaucracy **12**

a) Meaning and Nature
b) Features and Functions
c) Changing role of bureaucracy in Development Administration

UNIT VI:- Rural Development **12**

a) Meaning and Concept
b) Role of Panchayati Raj
c) District Rural Development Agency

UNIT VII:- People Participation in Development **12**

a) Meaning and Concept
b) Importance of people participation
c) Sant Gadgebaba Gram Swachata Abhiyan

UNIT VIII: - Emerging Issues in Development **12**

a) Globalization
b) Public-Private Partnership
c) Administrative Neutrality

Readings :

1. Sapru R.K., Development Administration, Sterling Publishing Pvt. Ltd., New Delhi, 1994.
2. Chatterji S.K., Development Administration with special reference to India, Surjit Publication, New Delhi, 1981.
3. Sharma R.D., Development Administration: Theory and Practive, R. D. Publishers and Distributers, Delhi, 1992.
4. Dr. Inamdar N.R., Dr. Kshire V.K., District Planning in Maharashtra, Oxford, Delhi, 1986.
5. Bhalerao C.N., (ed.), Administration, Politics and Development in India, Bombay Lalwani Publishing House.
6. Patil B.B., Development Administration (Marathi), Fadake Prakashan, Kolhapur.
7. Bang K.R., Development Administation (Marathi), Vidya Books Publishers, Aurangabad, 2011.

Structure /Pattern of syllabus- F.Y.B.A

1. Title of the course – **Gg- 110- Elements of Geomorphology (G-1)**
2. Preamble of the syllabus
   i. To introduce the students to the basic concepts in Geomorphology.
   ii. To introduce latest concepts in Geomorphology.
   iii. To acquaint the students with the utility and application of Geomorphology in different regions and environment.
   iv. To make the students aware of the need of protection and conservation of different landforms.
3. Introduction: Pattern –**Annual (20 marks internal -80 marks University)**
4. Eligibility- **12th pass any faculty**
5. Examination-
   A. Pattern of examination-

      i (Internal term end and University exam),

      ii. Pattern of question paper- 20-80

Internal Exam- 60 Marks = (converted to 20 marks)

University Exam- 80 Marks =

   B. Standard of passing- **Internal -08- University -32= Annual marks 40**
   C. ATKT rules- **No**
   D. Award of class- **F.Y.B.A. Pass**
   E. External students- **F.Y.B.A. Pass**
   F. Setting of question papers / pattern of question paper

Internal Exam- 60 Marks = (converted to 20 marks)

Question 1. Answers in 20 words- 14marks (any 7out of 10)

Question 2. Answers in 50 words -08 marks (any 2out of 4)

Question 3. Answers in 150 words- 18 marks (any 3 out of 5)

Question 4. Answers in 300 words- 20 marks (any 1 out of 2)

University Exam- 80 Marks =

Question 1. Answers in 20 words- 20 marks (any 10 out of 15)

Question 2. Answers in 50 words -10 marks (any 2out of 4)

Question 3. Answers in 150 words- 20 marks (any 2 out of 4)

Question 4. Answers in 300 words- 30 marks (any 2 out of 4)

G. Verification / Revaluation- **Yes**

6. Structure of the Course
   - **a.** Compulsory paper- **F.Y.B.A. General**
   - b. Optional paper- **No**
   - c. Question paper and papers etc - **One**
   - **d.** Medium of instructions- **Marathi and English**
7. Equivalence of previous syllabus along with propose syllabus- **yes**
8. University terms- **Annual**
9. Subject wise detail syllabus – **As per attached sheets**
10. Recommended books- **Mentioned in Syllabus**

Qualification of teacher- **M.A./M.Sc(Geography), as per UGC and University norms**

Equivalence of Syllabus in Geography (F.Y.B.A.) effective from June 2013

Old Syllabus June 2008		New Syllabus June 2013	
Gg-110	Physical Geography	Gg-110	Elements of Geomorphology

UNIVERSITY OF PUNE

F.Y.B.A.

Gg- 110 -Elements of Geomorphology (G-1)

Revised Syllabus (from June, 2013)

Objectives:

I. 1. To introduce the students to the basic concepts in Geomorphology.
II. To introduce latest concept in Geomorphology
III. To acquaint the students with the utility and application of Geomorphology in different regions and environment.
IV. To make the students aware of the need of protection and conservation of different landforms

Section I			
Unit No.	**Unit**	**Sub Unit**	**No. of periods**
1	Introduction to Geomorphology	a. Introduction to Physical Geography and its branches b. Geomorphology- Definition, Nature and Scope	8
2	Fundamental Concepts of The Earth	a. The Earth Size, Shape, Radius, Circumference, Parallels of Latitudes and Meridians of Longitudes. b. Time: Local time and Standard time, Time Zone and International Date Line.	6
3	The Earth	a. The earth – its Interior, Composition & Structure b. Origin of Continents and Ocean basin i. Wegener's Continental Drift Theory ii. Theory of Plate Tectonics- iii. Theory of Sea Floor Spreading	 5 6
4	Rocks	a. Rock- Definition and origin. b. Type of Rocks- Igneous, Sedimentary and Metamorphic rocks	5 5
5	Crustal Movements	a. Internal Movements- Definition, Causes b. Classification of Movements i. Slow movements- Folding and Faulting ii. Rapid movements – Volcanism and Earthquakes	5 5

		Section II	
6	Weathering	a. Definition of Weathering, b. Type of Weathering- Mechanical, Chemical, biological and Anthropogenic weathering c. Hydrological cycle	6
7	Agents of Erosions and Depositions	Landforms created by following agents a. Rivers. b. Sea-waves.	6
8	Mass Wasting	Concept – Type – Soil Creep, Landslides, Debris flows, Avalanches, Mud Flow	8
9	Slopes	Meaning & Definition of slopes, Types and slope segments Concave, Convex , Terraced, Rectilinear	6
10	Applications of Geomorphology	a. Human Activity: i. Settlement ii. Transport iii. Landuse iv. Mining v. Resource Evaluation b. Environmental Hazards & Assessment: i. Landslides ii. Tsunami iii. Soils Degradation iv. Floods c. Watershed Management: d. Field Visit (Not more than two days) for observations and identification of landforms.	6 5 4 4

Reference Books:

1 Physical Geography, Strahler. A.A. and Strahler A.N. 2002
2 Morphology and Landscape, H. Robinson, University Tutorial Press Ltd, London
3 The Face of Earth, Penguins 1980, Dury G. H.,
4 Introduction to Geomorphology, Oxford University Press, Calculatta 2001, Kale V. & Gupta A.
5 Geomorphology, Prayag Pustakalay, Alahabad, 1988, Singh Savinder
6 Prakrukik Bhuvigyan, Arvind Bhagwat, Shrikant Karlekar
7 Sugam Prakrutik Bhuvigyan, Prof. Suresh Date, Mrs. Date
8 Prakritik Bhugol, Part 1 & 2, W. R. Ahirrao, T. M. Varat, S. S. Alizad
9. Prakritik Bhugol, A. B. Savadi & P.S. Kolekar, Niralo Prakashan
10. Science and Systems of the Human Environment, John Wiley & Sons INC
11. Siddhartha K, 2001, The Earths Dyanamic Surface- Kisalaya Publication Pvt Ltd New Delhi

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BOARD OF STUDIES IN ECONOMICS

F.Y.B.A. Economics Revised Syllabus
(From June - 2013)

G-1 Indian Economy – Problems and Prospects

OR

G-I Agricultural Economics

UNIVERSITY OF PUNE

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Dr. R.Y.Shide	BOS Member
Dr. S.K Pagar	BOS Member
Dr. R.K Datir.	Subject Expert
Dr. R.G Rasal.	Subject Expert

University of Pune
F.Y.B.A. Economics Revised Syllabus.
G-1 Indian Economy – Problems and Prospects
(From June - 2013)
Section – I

1. Developing Economy. (12)

1.1 Developed and Developing Economy – Meaning & Concept.

1.2 Basic Characteristics of Indian Economy as a Developing Economy.

1.3 Comparison of Indian Economy with Developed Countries –

a) Population b) Per-capita Income c) Human Development Index.

d) Agriculture e) Industry f) Service Sector.

1.4 Major issues of Development in India

2. Population . (12)

2.1 Theory of Demographic Transition.

2.2 Size and Growth of Population.

2.3 Features of Indian population

2.3.1Sex Composition.

2.3.2 Rural Urban Distribution.

2.3..3 Age Composition.

2.3.4 Density of Population.

2.3.5 Occupational Distribution.

2.3.6 Quality of Population.

2.4 Causes of growing Population.- High Birth rate and Decreasing Death rate.

2.5 Problems of Over Population

2.6 Measures for Population Control.

2.7 Population Policy 2005 onward

3. Poverty and Unemployment (12)

3.1 Meaning and Concept of Poverty.

3.2 Poverty line- Need of redefining.

3.3 Measurement of Poverty.

3.4 Causes of Poverty.

3.5 Measures of eradication of Poverty.

3.6 Unemployment – Nature & Types, Causes & Measures

4. Agriculture. (12)

4.1 Place of Agriculture in Indian economy.

4.2 Agricultural Productivity – Causes of Low Productivity & Measures.

4.3 Green Revolution- Achievements & Failures.

4.4 Sources of Agricultural Finance.

4.5 Agricultural Marketing – Defects & Measures.

4.6 Suicide of Farmer's - Causes and Measures to prevent Farmer's Suicide

4.7 Special Economic Zone- Concept, Features, Problems.

Section – II

5. Industry. (12)

5.1 Role of Industrialization.

5.2 Industrial Policy – 1991.

5.3 New Economic Reforms – Concept

i) Liberalization ii) Privatisation, iii) Globalization .

5.4 Small and Large Scale Industry – Growth and Problems.

5.5 Growth of Knowledge Based Industry – IT, Software Consultancy.

6. Labour. (12)

6.1 Meaning and Classification of Labour.

6.2 Characteristics of Industrial Labour.

6.3 Industrial Dispute :- Causes, Measures for Settlement.

6.4 Social Security Measures in India.

7. Planning. (12)

7.1 Meaning, Concept, Need and Objectives.

7.2 Types of Planning – Merits and Demerits.

7.3 Objectives, Achievements, and Failures of 11^{th} Five Year Plan.

7.4 Objectives, of 12^{th} five year plan

8. Economy of Maharashtra. (12)

8.1 Salient Features of Economy of Maharashtra.

8.2 Co-operative Movement – Progress, Problems & Prospectus.

8.3 Role of Co-operative in Economic Development of Maharashtra.

8.4 Regional Imbalance Causes & Preventive Measures.

8.5. Water Management concept and utility

Basic Reading List

- Gaurav Datta Ashwani Mahajan (2012), Indian Economy. S. Chand & Company Ltd., New Delhi.
- Misra & Puri - (2011) Indian Economy, Himalaya Publication house, Mumbai.
- Gopal and Suman Banhri (2013) Indian Economy Performance and Policies. Pearson Publication Delhi.
- Prakesh B.A. (2011) The Indian Economy Since 1991 Economic Reforms and performance, Pearson Publication Delhi.

- **Reference Books**

- Tandon - Indian Economy.
- Dhar P.K., Indian Economy.
- Agrawal A.N., Problems of Development & Planning.
- Memoria C.B. Agricultural Problems of India, Kitab Mahal Publication. Kitab mahal, New Dehli.
- Dr. Datir R.K. And others Bharatiya Arthvyavastha- 5th Edition 2012, Nirali prakashan Pune.
- Jalan B.,The Indian Economy Problem and prospectus, Viking, New Dehli
- Planning Commission (2007), Eleven Five Year Plan (2007-12).
- Govt. of India – Economic Survey.
- World Bank – World Development Report.
- Census of India (2001),
- C.S.O. National Account Statistics.

University of Pune
F.Y.B.A Economics- General Paper - I
G-I Agricultural Economics
(From June 2013)
Section – I

1) Introduction **(10)**

1.1 Agricultural Economics - Meaning, Nature, Scope and Importance
1.2 Role of Agriculture in Economic Development
1.3Trends in Agricultural Growth since 1950-51

2) Development of Agriculture **(14)**

2.1 Agricultural Productivity – Meaning and concept
2.1.1 Causes of Low Productivity and Measures.
2.1.2 Regional Variations, Comparison with Developed Countries,
2.2 Green Revolution – Achievement and Failures. Need of second Green Revolution
2.3 Changes in Cropping Pattern
2.4 Organic Farming – Meaning & Scope

3. Recent Issues in Indian Agriculture (12)

3.1 Environmental Issues
3.2 Special Economic Zone (SEZ) - Impact on Agriculture.
3.3 Farmers Suicide – Causes & Preventive Measures.
3.4 Agriculture Price Policy.
3.5 Issues on Agriculture - Food Security.

4. Agricultural Marketing (12)

4.1 Problems and Remedies of Agricultural Marketing in India.
4.2 Co- operative Marketing – Merits and demerits.
4.3 Market Model Act 2007.
4.4 Agricultural Export and Import –policies since 2009
4.5 Foreign direct investment in Agriculture

Section – II

5. Agricultural Labour (12)

5.1 Agricultural Labour - Meaning and concept.
5.2 Features of Agricultural Labour.
5.3 Type of Agricultural Labour
5.4 Minimum Wages Act.
5.5 National Rural Employment Guaranty Scheme.- Nature & Evaluation

6) Agricultural Finance **(12)**

6.1 Importance of Agricultural Finance
6.2 Sources of Agricultural Finance
6.3 Problems of Agricultural Finance
6.4 Role of NABARD in Agricultural Finan**ce**
6.5 Role of Micro Finance

7) Irrigations and Agricultural Inputs (12)

7.2 Importance of Irrigations in Agriculture
7.2 Type of Irrigation – Traditional Advanced
7.3 . Type of New Irrigation System -Benefits of New of Irrigation
7.4 Role of Farmer in Water Management
7.5 Drought –Reason and Remedies

8) WTO and Indian Agriculture (12)

8.1 WTO – Objectives and Functions.
8.2 WTO- Agreement on Agricultural, Patent Policy
8.3 WTO-Impact on Indian Agriculture

Basic Reading List

- Dalt.R.& K.P.M.Sundharm (2011), Indian Economy , S.Chand & Co.Ltd New Delhi
- Misra S.K. & V.K.Puri (2011), Indian Economy Himalaya Publication house Mumbai
- Sadhu A.N. and J.Sing, Agricultural Problems in India, Himalaya Publishing House Mumbai
- Sundarm I.S. Rural Development Himalaya Publishing House Mumbai

Additional Reading List

- Gopal and Suman Banhri (2013) Indian Economy Performance and Policies. Pearson Publication Delhi.
- Dr. Datir R.K. And others Bharatiya Arthvyavastha- 5th Edition 2012, Nirali prakashan Pune.
- GoMamoria C-D : Agricultural Problem of India Kitab Mahal 2005
- Government of India ,Economic Survey New Delhi
- RBI,Hand Book of statistics of India.

UNIVERSITY OF PUNE
Revised structure of Syllabus for B.A. Geography to be effective from

F.Y.B.A. – June, 2013
S.Y.B.A. – June, 2014
T.Y.B.A. – June, 2015

F.Y.B.A.		
G-1	**Gg-110**	**Elements of Geomorphology**

S.Y.B.A.		
G-2	**Gg-210**	**Elements of Climatology and Oceanography**
		OR
G-2	**Gg-210**	**Geography of Disaster Management**
S-1	**Gg-220**	**Economic Geography**
		OR
S-1	**Gg-220**	**Tourism Geography**
S-2	**Gg-201**	**Fundamentals of Geographical Analysis**

Equivalence of Syllabus in Geography (S.Y.B.A.)

Effective from June 2014

Old Syllabus (June 2009)		New Syllabus (June 2014)		Equivalent (Yes / No)
Gg-210	Geography of Human Resources	Gg-210	Elements of Climatology and Oceanography	No
Gg-210	Geography of Natural Hazards	Gg-210	Geography of Disaster Management	Yes
Gg-220	India: A Geographical Analysis	Gg-220	Economic Geography	No
Gg-220	China: A Geographical Analysis	Gg-220	Tourism Geography	No
Gg-201	Fundamentals of Geographical Analysis	Gg-201	Fundamentals of Geographical Analysis	Yes

Structure /Pattern of syllabus- S.Y.B.A

1. Title of the course – **Gg- 210- Elements of Climatology and Oceanography (G-2)**
2. Preamble of the syllabus

   i. To introduce the students to the basic principles and concepts in Climatology and Oceanography.
   ii. To acquaint the students with the applications of Climatology and Oceanography in different areas and environment.
   iii. To make the students aware of the Planet Earth and thereby to enrich the student's knowledge.
3. Introduction: Pattern –**Annual (20 marks internal, 80 marks University)**
4. Eligibility- **F.Y.B.A. pass**
5. Examination-

   A. Pattern of examination-

   i Internal term end and University exam,

   ii. Pattern of question paper- 20 : 80

Internal Exam- 60 Marks = (converted to 20 marks)

University Exam- 80 Marks =

B. Standard of passing- **Internal -08- University -32= Annual marks 40**

C. ATKT rules- Y**es**

D. Award of class- **S.Y.B.A. Pass**

E. External students- **S.Y.B.A. Pass**

F. Setting of question papers / pattern of question paper

Internal Exam- 60 Marks = (converted to 20 marks)

Question 1. Answers in 20 words- 14marks (any 7 out of 10)

Question 2. Answers in 50 words -08 marks (any 2 out of 4)

Question 3. Answers in 150 words- 18 marks (any 3 out of 5)

Question 4. Answers in 300 words- 20 marks (any 1 out of 2)

University Exam- 80 Marks =

Question 1. Answers in 20 words- 20 marks (any 10 out of 15)

Question 2. Answers in 50 words -10 marks (any 2 out of 4)

Question 3. Answers in 150 words- 20 marks (any 2 out of 4)

Question 4. Answers in 300 words- 30 marks (any 2 out of 4)

G. Verification / Revaluation- **Yes**

6. Structure of the Course

   a. Compulsory paper- S**.Y.B.A. General**

b. Optional paper- **Yes**

c. Question paper and papers etc - **One**

d. Medium of instructions- **Marathi and English**

7. Equivalence of previous syllabus along with propose syllabus- **yes**

8. University terms- **Annual**

9. Subject wise detail syllabus – **As per attached sheets**

10. Recommended books- **Mentioned in Syllabus**

Qualification of teacher- **M.A./M.Sc (Geography), as per UGC and University norms**

Structure /Pattern of Syllabus- S.Y.B.A

1. Title of the course – **Gg- 210- Geography of Disaster Management (G-2)**
2. Preamble of the syllabus
    i. To introduce students the concept of disaster & its relation with Geography.
    ii. To acquaint the students with the utility & application of hazards in different areas & its management.
    iii. To make the students aware of the need of protection & disaster management.
3. Introduction: Pattern –**Annual (20 marks internal; 80 marks University)**
4. Eligibility- **F.Y.B.A. pass**
5. Examination-
    A. Pattern of examination-

i Internal term end and University exam,

ii. Pattern of question paper- 20 : 80

Internal Exam- 60 Marks = (converted to 20 marks)

University Exam- 80 Marks =

B. Standard of passing- **Internal -08, University -32= Annual marks 40**

C. ATKT rules- **Yes**

D. Award of class- S**.Y.B.A. Pass**

E. External students- S**.Y.B.A. Pass**

F. Setting of question papers / pattern of question paper:

Internal Exam- 60 Marks = (converted to 20 marks)

Question 1. Answers in 20 words- 14 marks (any 7out of 10)

Question 2. Answers in 50 words -08 marks (any 2out of 4)

Question 3. Answers in 150 words- 18 marks (any 3 out of 5)

Question 4. Answers in 300 words- 20 marks (any 1 out of 2)

University Exam- 80 Marks =

Question 1. Answers in 20 words- 20 marks (any 10 out of 15)

Question 2. Answers in 50 words -10 marks (any 2out of 4)

Question 3. Answers in 150 words- 20 marks (any 2 out of 4)

Question 4. Answers in 300 words- 30 marks (any 2 out of 4)

G. Verification / Revaluation- **Yes**

6. Structure of the Course
    a. Compulsory paper- S**.Y.B.A. General**
    b. Optional paper- **Yes**
    c. Question paper and papers etc - **One**
    d. Medium of instructions- **Marathi and English**
7. Equivalence of previous syllabus along with proposed syllabus- **Yes**
8. University terms- **Annual**
9. Subject wise detail syllabus – **As per attached sheets**
10. Recommended books- **Mentioned in Syllabus**

Qualification of teacher- **M.A./M.Sc (Geography), as per UGC and University norms**

Structure /Pattern of Syllabus- S.Y.B.A

1. Title of the course – **Gg- 220- Economic Geography (S-1)**
2. Preamble of the syllabus

   i. To introduce the students to the basic principles and concepts in Economic Geography

   ii. To acquaint the students with the applications of Economic Geography in different areas and development.

   iii. The main aim is to integrate the various factors of economic development and to acquaint the students about this dynamic aspect of economic geography

3. Introduction: Pattern –**Annual (20 marks internal, 80 Marks University)**
4. Eligibility- **F.Y.B.A. pass**
5. Examination-

   A. Pattern of examination-

   i Internal term end and University exam,

   ii. Pattern of question paper- 20 : 80

Internal Exam- 60 Marks = (converted to 20 marks)

University Exam- 80 Marks =

B. Standard of passing- **Internal -08, University -32= Annual marks 40**

C. ATKT rules- **Yes**

D. Award of class- S**.Y.B.A. Pass**

E. External students- S**.Y.B.A. Pass**

F. Setting of question papers / pattern of question paper:

Internal Exam- 60 Marks = (converted to 20 marks)

Question 1. Answers in 20 words- 14 marks (any 7 out of 10)

Question 2. Answers in 50 words -08 marks (any 2 out of 4)

Question 3. Answers in 150 words- 18 marks (any 3 out of 5)

Question 4. Answers in 300 words- 20 marks (any 1 out of 2)

University Exam- 80 Marks =

Question 1. Answers in 20 words- 20 marks (any 10 out of 15)

Question 2. Answers in 50 words -10 marks (any 2 out of 4)

Question 3. Answers in 150 words- 20 marks (any 2 out of 4)

Question 4. Answers in 300 words- 30 marks (any 2 out of 4)

G. Verification / Revaluation- **Yes**

6. Structure of the Course

   a. Compulsory paper- S**.Y.B.A. General**

   b. Optional paper- **Yes**

c. Question paper and papers etc - **One**

d. Medium of instructions- **Marathi and English**

7. Equivalence of previous syllabus along with propose syllabus- **yes**

8. University terms- **Annual**

9. Subject wise detail syllabus – **As per attached sheets**

10. Recommended books- **Mentioned in Syllabus**

Qualification of teacher- **M.A./M.Sc (Geography), as per UGC and University norms**

Structure /Pattern of Syllabus- S.Y.B.A

Title of the course – **Gg- 201- FUNDAMENTALS OF GEOGRAPHICAL ANALYSIS (S-2)**

11. Preamble of the syllabus

i To enable the students to use various Projections and Cartographic Techniques.
ii To acquaint the students with basic of Statistical data.
iii To acquaint the students with the principles of surveying, its importance and utility in the geographical study.

12. Introduction: Pattern –**Annual (100 marks University)**

13. Eligibility- **F.Y.B.A. pass**

14. Examination-

H. Pattern of examination-

University Exam- 100 Marks =

I. Standard of passing- **University - Annual marks 40**

J. ATKT rules- **Yes**

K. Award of class- S**.Y.B.A. Pass**

L. External students-**No**

M. Setting of question papers / pattern of question paper

University Exam- 100 Marks = As per scheme of marking

N. Verification / Revaluation- N**o**

15. Structure of the Course

e. Compulsory paper- S**.Y.B.A.**

f. Optional paper- N**o**

g. Question paper and papers etc – **As per batch**

h. Medium of instructions- **Marathi and English**

16. Equivalence of previous syllabus along with propose syllabus- **yes**

17. University terms- **Annual**

18. Subject wise detail syllabus – **As per attached sheets**

19. Recommended books- **Mentioned in Syllabus**

Qualification of teacher- **M.A./M.Sc(Geography), as per UGC and University norms**

Structure /Pattern of Syllabus- S.Y.B.A.

(From June 2014)

1. Title of the Course – **Gg- 220- Tourism Geography (S-1)**

2. Preamble of the Syllabus

   i. To acquaint the student's basic concepts of Geography & Tourism.
   ii. To aware the students with the utility and application of Tourism.
   iii. To help the students & society to understand the interrelationship between tourism and employment generation opportunities.
   iv. To understand the impact of tourism on Physical and Human Environments.

3. Introduction: Pattern –**Annual (20 marks internal; 80 marks University)**

4. Eligibility- **F.Y.B.A. pass**

5. Examination-

   A. Pattern of examination-

      i (Internal term end and University exam),

      ii. Pattern of question paper- 20 : 80

Internal Exam- 60 Marks = (converted to 20 marks)

University Exam- 80 Marks =

   B. Standard of passing- **Internal -08, University -32 = Annual marks 40**

   C. ATKT rules- **Yes**

   D. Award of class- S**.Y.B.A. Pass**

   E. External students- S**.Y.B.A. Pass**

   F. Setting of question papers / pattern of question paper

Internal Exam- 60 Marks = (converted to 20 marks)

Question 1. Answers in 20 words- 14 marks (any 7 out of 10)

Question 2. Answers in 50 words -08 marks (any 2 out of 4)

Question 3. Answers in 150 words- 18 marks (any 3 out of 5)

Question 4. Answers in 300 words- 20 marks (any 1 out of 2)

University Exam- 80 Marks =

Question 1. Answers in 20 words- 20 marks (any 10 out of 15)

Question 2. Answers in 50 words -10 marks (any 2 out of 4)

Question 3. Answers in 150 words- 20 marks (any 2 out of 4)

Question 4. Answers in 300 words- 30 marks (any 2 out of 4)

G. Verification / Revaluation- **Yes**

6. Structure of the Course
   - **a.** Compulsory paper- S**.Y.B.A. General**
   - b. Optional paper- **Yes**
   - c. Question paper and papers etc - **One**
   - **d.** Medium of instructions- **Marathi and English**
7. Equivalence of previous syllabus along with proposed syllabus- **No**
8. University terms- **Annual**
9. Subject-wise detail syllabus – **As per attached sheets**
10. Recommended books- **Mentioned in Syllabus**

Qualification of teacher- **M.A./ M.Sc (Geography), as per UGC and University norms**

Structure /Pattern of Syllabus- S.Y.B.A

Title of the course – **Gg- 201- FUNDAMENTALS OF GEOGRAPHICAL ANALYSIS (S-2)**

Preamble of the syllabus

i To enable the students to use various Projections and Cartographic Techniques.
ii To acquaint the students with basic of Statistical data and diagrams.
iii To acquaint the students with the principles of surveying, its importance and utility in the geographical study.

1. Introduction: Pattern –**Annual (100 marks University)**
2. Eligibility- **F.Y.B.A. pass**
3. Examination-
   A. Pattern of examination-

   University Exam- 100 Marks

   B. Standard of passing- **University - Annual marks 40**

   C. ATKT rules- **Yes**

   D. Award of class- S**.Y.B.A. Pass**

   E. External students- **No**

   F. Setting of question papers / pattern of question paper-

   University Exam- 100 Marks = As per scheme of marking

   G. Verification / Revaluation- **No**
4. Structure of the Course
   a. Compulsory paper- S**.Y.B.A.**
   b. Optional paper- N**o**
   c. Question paper and papers etc – **As per batch**
   d. Medium of instructions- **Marathi and English**
5. Equivalence of previous syllabus along with proposed syllabus- **Yes**
6. University terms- **Annual**
7. Subject wise detail syllabus – **As per attached sheets**
8. Recommended books- **Mentioned in Syllabus**

Qualification of teacher- **M.A./M.Sc (Geography), as per UGC and University norms**

Gg 210: Elements of Climatology and Oceanography (G2)

Objectives:

1. To introduce the students to the basic principles and concepts in Climatology and Oceanography.
2. To acquaint the students with the applications of Climatology and Oceanography in different areas and environment.
3. To make the students aware of the Planet Earth and thereby to enrich the student's knowledge.

Section I - Climatology			
No.	Unit	Sub Units	Periods
1	Introduction to Climatology and Atmosphere	1. Definition, nature and scope 2. Importance of Climatology in modern times. 3. Weather and climate, elements of weather and climate 4. Composition and structure of the atmosphere	10
2	Insolation	1. Heat budget of the Earth. 2. Factors affecting horizontal distribution of temperature. 3. Inversion of temperature, lapse rate and its types. 4. Global warming.	8
3	Atmospheric Pressure and Wind System	1. Vertical and horizontal distribution of pressure. 2. Formation of pressure belts and their relation with winds. 3. Concept of pressure gradient. 4. Type of winds- planetary winds, periodic winds (Monsoon winds), local winds - land and sea breezes, mountain and valley winds. 5. El Niño and La Niña	10
4	Atmospheric Moisture and Precipitation	1. Sources of moisture, methods to express humidity of the air- absolute and relative humidity. 2. Forms of precipitation- rain, snow, dew, hail and fog. 3. Types of clouds- high, medium low clouds.	10
5	Atmospheric Disturbances	1.Cyclones- tropical and temperate and associated weather conditions. 2.Anticyclones and associated weather conditions.	7

Section II – Oceanography			
6	Oceanography	1. Definition, nature and scope. 2. Relevance of Oceanography on earth	8
7	Submarine Relief	1. General idea of ocean relief. 2. Relief of Atlantic, Pacific and Indian oceans.	8
8	Properties of Ocean Water	1. Properties of ocean water- temperature, density. 2. Salinity- meaning and causes. 3. Salinity of oceans, seas, and lakes with examples.	10
9	Movements of Ocean Water	1. Waves- Characteristics of sea waves, tsunamis. 2. Ocean currents- meaning, causes, types. 3. Ocean currents of Atlantic, Pacific and Indian Oceans 4. Effects of ocean currents. 5. Tides- meaning, causes, types. 6. Equilibrium theory of tides.	12
10	Coastal Environment	1.Significance of Coastal Environment. 2.Oceans as Storehouse of Resources for the future	7

Reference Books:

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Dasgupta, A. and Kapoor, A.N., Principles of Physical Geography.
Grald, S., General Oceanography.
Ttrewartha, G., Introduction to Weather and Climate.
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Lake, P., Physical Geography.
Lutgens, F.K. and Tarbuck, E.J., 2007. The Atmosphere, Pearson Prentice Hall,
Pirie, R.G., Oceanography (Contemporary).
Ross, D.A., 1988. Introduction to Oceanography. Prentice Hall, New Jersey.
Sharma, R.C. and Vatel. M.,- Oceanography for Geographers.
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Strahler, A.H. and Strahler, A. N., 1992. Modern Physical Geography, John Wiley and Sons, Inc.
Strahler, A.N., 1965. Introduction to Physical Geography, John Wiley and Sons, INC.
Ahirrao, W.R., Alizad, S.S. and Dhapte, C.S., 1998. Climatology and Oceanography, Nirali Prakashan, Pune.
Bhagvat Arvind and Karlekar Shrikant : Prakrutik Bhuvidnyan
Datye and Datye : Sugam Prakrutik Bhuvidyan.

Various websites of internet.

Gg-210 Geography of Disaster Management (G2)

Objectives:-

1) To introduce students the concept of disaster & its relation with Geography.
2) To acquaint the students with the utility & application of hazards in different areas & its management.
3) To make the students aware of the need of protection & disaster management.

SECTION - I

Sr. No.	Topic	Sub Topic	Learning Points	Periods
1	Introduction to hazards, disasters	Definition and types	a) Meaning, definition, b) Geographical conditions and disasters c) Classification of disasters	10
2	Basic concepts in disaster management.	Terminology and concepts	a) Concept of management b) Aims and objectives c) Pre-disaster management d) Post – disaster management	12
3.	Disaster management and measures	Structural and Non -structural measures	a) Structure of disaster management -Preparedness, Response, Recovery, Mitigation, Rehabilitation b) Standard operating procedure of management on government level c) Role of media	13
4	Climatic disasters and their management	causes, effects, area and management	a) Cyclones as disasters b) Droughts as disasters c) Floods as disasters	10

SECTION – II

Sr. No.	Topic	Sub Topic	Learning Points	Periods
5	Geological and Geomorphic disasters and their management	Causes, effects, area and management	a) Earthquakes as disasters b) Landslides as disasters c) Tsunami as disasters	10
6	Anthropogenic disasters and their management	Trend, types, area, causes, effects and remedies.	a) Deforestation b) Forest fire as disasters c) Soil degradation d) Over exploitation of resources	12
7	Global issues and movements	Causes, effects and measures to conservation.	a) Global warming b) Ozone depletion c) Acid rain	10
8	Case Studies of disaster Managements	Management of Indian and Global disasters	a) Tsunami in Indian ocean -2004 b) Kedarnath Cloud Burst -2013 c) Fukushima Nuclear disaster -2011 d) Hail storm in Maharashtra- 2014	13

Reference books:

1. Alexander David, 2000, Introduction in Confronting Catastrophe, Oxford University Press.
2. Alexander, D. (1993): Natural Disasters. UCL Press Ltd., London
3. Andharia J. 2008, Vulnerability in Disaster Discourse, JTCDM, Tata Institute of Social Sciences Working Paper no. 8.
4. Blakie, P. Cannon T, Davis I, Wisner B. 1997, At Risk Natural Hazards, People Vulnerability and Disasters Rourledge.
5. Bloom, A.L., 1998. Geomorphology. A Systematic Analysis of Late Cenozoic Landforms. Pearson Education (Singapore) Pte. Ltd.
6. Chandna, R. C., 2000. A Geography of Population, Concepts, Determinants and Patterns, Kalyani Publishers, New Delhi.
7. Copola P Damon, 2007, Introduction to International Disaster Management
8. Cuny, F. 1983, Development and Disaster, Oxford University Press.
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10. Hamblin, W.K., 1989. The Earth's Dynamic Systems, Macmillan Publishing Company, New York.
11. Huggett, D.A., 2004. Fundamentals of Biogeography, Routledge.
12. Kale, V.S. and Gupta, A., 2001. Introduction to Geomorphology, Orient Longman, Calcutta.
13. Knox, P. and Agnew J., 1998. The Geography of the World Economy, Arnold, London.
14. Lutgens, F.K. and Tarbuck, E.J., 2007. The Atmosphere. Prentice Hall, Englewood Cliffs, New Jersey, USA.
15. Ross, D. A., 1988. Introduction to Oceanography. Prentice Hall, New Jersey.
16. Saptarshi P. G., More J. C., Ugale V. R. (2009), "Geography and Natural Hazard" Diamond, Pune.
17. Savindra Singh, (2000): Environmental Geography. Prayag Pustak Bhavan, Allahabad
18. Singh, S., 1998. Geomorphology, Prayag Pustak Bhavan, Allahabad.
19. Strahler, A.A. and Strahler, A. N., 2002. Physical Geography: Science and Systems of the Human Environment, John Wiley and Sons, INC.
20. A.H.Choudhar ,P.N.Salve, S.M.Kadam.R.H.Choudhar,V.C.Ithape (2010), "Contemporary Issues and Geography",Atharva ,Pune.

Gg 220: Economic Geography (S-1)

Objectives:

1. To introduce the students to the basic principles and concepts in Economic Geography
2. To acquaint the students with the applications of Economic Geography in different areas and development.
3. The main aim is to integrate the various factors of economic development and to acquaint the students about this dynamic aspect of economic geography.

Section I			
No.	**Unit**	**Learning Points**	**Periods**
1	Introduction to Economic Geography	1.Introduction, Definition and meaning 2.Nature and Scope 3. Recent trends of economic geography 4. Approaches to study of economic geography	10
2	Economic Activities	1.Sectors of Economy- Primary, Secondary and Tertiary with examples 2. Concept of More Developed, Developing and Less Developed countries. 3. Impact of economic activities on environment.	10
3	Natural Resources	1.Introduction, Meaning 2. Importance of Natural Resources 3. Classification of Natural Resources- Renewable and Non-renewable 4. Conservation of Resources	11
4	Minerals and Energy Resources	1.Classification of Minerals 2. Ferrous and Non-ferrous and their world distribution- Iron Ore, Manganese, Copper, Mica. 3. Energy Resources - (a) Conventional - Coal, Petroleum, Hydel and Atomic (b) Non-Conventional- Solar, Wind, Tidal, Energy from Solid Waste 4. Energy Crisis in India	14
Section-II			
5	Industries	1.Factors affecting on Industrial Location 2.Weber's Theory of Industrial Location 3.Major Industries- a) Iron and Steel Industries	12

		b) Cotton Textile Industries c) Automobile Industries d) Ship Building Industries e) Paper Industries	
6	Agriculture	1.Importance of Agriculture 2.Factors influencing agriculture- physical, economic, social, cultural 3. Spatial Distribution of major food and cash crops- Wheat, Rice, Maize, Rubber 4. Agricultural Classification- a) Subsistence Agriculture b) Commercial Grain Farming c) Plantation Agriculture d) Market Oriented Farming 5.Role of Agriculture in Indian Economy	12
7	Transport and Trade	1.Geograpahical factors influencing Development of Transportation. 2. World Distribution of Roads, railways, waterways, airways and pipelines. 3. Factors Influencing on International Trade. 4. Ricardo's Classical Theory 5. World Trade Organisation (WTO), OPEC	12
8	Economic Development in India	1.Economic Development in Pre and Post-independence period. 2. Impact of Green Revolution 3.Privatization, Globalisation and Liberlisaion.	9

References:-

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Knowles R, Wareing J : (2004) Economic and Social Geography Made Simple, Rupa and company

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Majid Husain (1979) : Agriculture Geography

Singh Jasbir, Dillon S.S. (2004): Agriculture Geography, Tata McGraw Hill

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Mamoria C.B. (1980): Economic and Commercial Geography of India, Shiva Lal Agarwal and Compnay.

Gg- 220 : Tourism Geography (S-1)

Objective:-

1) To acquaint the student's basic concepts of Geography & Tourism
2) To aware the students with the utility and application of Tourism
3) To help the students & society to understand the interrelationship between tourism and employment generation opportunities.
4) To understand the impact of tourism on Physical and Human Environments.

Section-I				
No.	Unit	Sub-unit	Learning Points	Periods
1	Introduction to Tourism Geography	(A) Introduction and Definition	1.Introduction 2.Definition of Tourists and Tourism	10
		(B) Nature of Tourism Geography	1.Uniqueness 2. Diversity 3.Recreational 4. Dynamic 5.Interdisciplinary 6.Non-Productive 7.Seasonal	
		(C) Scope of Tourism Geography	1 Tourism as a Basic Need of Mankind 2 Tourism and Transportation 3 Natural environment and Tourism 4. Culture and Tourism 5. Religion and Tourism 6. Tourism Products	
		(D) Importance	1 Relation Between Geography and Tourism 2 Importance of Tourism	
2	Concepts and Classification of Tourism	(A) Concepts	1 Geo-Tourism 2 Agro- Tourism 3 Heritage Tourism 4 Adventure Tourism 5 Religious Tourism 6 Health Tourism 7 Sport Tourism 8 Disaster Tourism	15
		(B) Classification Based on a)Nationality	1. International 2. National 3. Regional 4. Local	
		b) Travel Time	1. Long Haul 2. Short Haul.	
		c)Travel Distance	1. Global 2. National 3. Regional 4. Local	

		d) Number Of Tourists e) Purpose f) Approach	1. Groups 2. Family Members 3. Individual 1. Religious 2. Recreation 3. Heritage 4. Adventure 5. Nature 6. Health 7. Sports 1. Eco-tourism as an Approach	
3	Assessing Tourism Potentials -I	Physical Factors (A) Relief (B) Water bodies (C) Climatic (D) Forest	1. Mountain 2. Plateau 3. Plain 4. Sea Beaches 5. River Source 6. Water Fall 1. Lakes/ Dams 2. Hot Spring 3. Natural gassers 4. River –Confluences 1. Hill Station 2. Snow Fall 3. Rainy Season 4. Sanatoriums 1. National Park 2. Santuaries (With Indian Examples)	10
4	Assessing Tourism Potentials -II	Socio- Cultural Factors (A) Religious (B) Historical (C) Socio-Cultural	Pilgrim – All Religious Centers Historical Monuments Culture, Festivals, Sports Centres, Warli Paintings, Ideal Village (With Indian Examples)	10
Section -II				
5	Transportation and Communication	Infrastructure and Support System	1. Road 2. Rail 3. Water 4. Air 5. Space 1. Guide 2. Telephone/ mobile/ TV 3. Internet 4. Electronic & Printing Media 5. Travel & Tourist Agencies	10
6	Accommodation	Accommodation Types	1 Private Hotels, motels, Inn 2 Govt. accommodation- Tourist home, Guest House, Rest house, Youth Hostel, Tents, Caravans and Bed & Breakfast 3. Rail Yatribhavan 4. House boats 5. Dharmashala	10

7	Impact of Tourism	(A)Environmental Impact (B) Economic Impacts (C) Social and Cultural Impact	1.Land Degradation 2.Pollution – Land, Water, Air 3. Loss of Plants 4. Loss of Wild Animals and Birds 1. Tourism as an Economic Activity 2. Effect on foreign Exchange 3. Employment generation 4. Increase of Land Values 5. Increase of Trading Activity 6. Increase of Govt. Revenues 7. Growth of infrastructure development 8.Multiple effect 1.New colonialism 2. Crime 3.Religion 4. Language 5. Health 6. Traditional Arts	12
8.	Case Studies of Major Tourist Centers in India	(A). Hill Station (B) Beach Point (C). Historical (D) Religious (E) Dams/ Lake	1.Manali 2.Mahabaleshwar 1. Marina Beach (Chennai) 2.Diveagar (Raigadh) 1 Konark Sun Temple (Orissa) 2. Raigadh Fort 1. Vaishno Devi (Jammu) 2. Shegaon (Buldhana) 1. Sardar Sarovar (Gujrat) 2. Lonar Lake (Buldhana)	13

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Gg-201 : FUNDAMENTALS OF GEOGRAPHICAL ANALYSIS

From June 2014

Workload : Six periods per week per batch (12 Students Per Batch)
(Examination for the Course will be conducted at the end of academic year)

Objectives:

1. To enable the students to use various Projections and Cartographic Techniques.
2. To acquaint the students with basic of Statistical data.
3. To acquaint the students with the principles of surveying, its importance and utility in the geographical study.

SECTION- I

No	Topic	Learning Points	Exercises	No. of periods
1	Maps and Scales	1. Maps : Meaning, definition and Types 2. Map Scale : Definition and Types	1. Map : Meaning, Definition and Types. 2. Map Scale : Definition and Types Conversion of Verbal scale to numeric and vice-versa (in British and Metric Systems) i) Construction of simple graphical scale (Two examples) i) Construction of comparative scale (Two examples)	15
2	Map Projection	1. Definition and need of Map Projection 2. Classification of map projection based on method of construction and developable surfaces used.	1. Zenithal Polar projection. i. Zenithal Polar Gnomonic Projection ii. Zenithal Polar Stereographic Projection. 2. Conical Projection : i. Projection with one standard parallel ii. Bonne's Projection 3. Cylindrical Projection i. Cylindrical equal area Projection. ii. Mercator's Projection *4.*Covenetional Map Projections i. Mollweide's Projection (Construction of above map projection with properties and uses of each group : one example from each hemisphere).	20
3	Data Representation by various techniques	1. Graphs and Diagrams	1. Simple Line Graph 2. Polygraph 3. Simple Bar Diagram 4. Compound Bar Diagram 5. Pie Diagram (Chart) 6. Choropleth Mapping Plotting & Presentation using computers	15

4	Basic analysis of Statistical Data	1. Population and Sample 2. Statistical Data and Frequency	1. Population, sample, Method of sampling, Characteristics of sample 2. Tally marks and frequency table. 3. Frequency distribution (histogram and polygon) 4. Cumulative Frequency and Ogive curve.	10
SECTION II				
5	Surveying	1. Directions 2. Definition of Surveying 3. Types of Surveying 4. Measurement of Land	1. Various Methods of deciding North direction True, Magnetic and Grid North 2. Plane Table Survey. i. Radiation Method ii. Intersection methods 3. Prismatic Compass Surveying Methods: ii. Open Travers ii. Close Travers 4.GPS Survey & Plotting Finding Latitude (X), Longitude (Y) and Altitude (Z). Plotting of X and Y on graph paper 5. Dumpy Level Survey Plotting by- i. Rise and Fall Method *ii.* Collimation Plane Method 6. At least exercise involving of actual measurement of piece of a land.	40
6	Field Excursion / Village/ Urban Survey	Visit two places of geographical interest anywhere in the country.	One short tour of two days duration and Preparation of tour report. OR One long tour more than five days and preparation of tour report	20

Note : 1. Use of stencils, log tables, computer and calculator is allowed.
2. Journal should be completed and duly certified by practical in-charge and Head of the Department.
3. Int. and Ext examiner should set jointly the question paper for each batch

Reference Books :

1. Singh Lehraj, (1973) : Map Work and Practical Geography, Central Book Depot – Allahabad
2. D. Y. Ahirrao and E. K. Karanjkhele, (2002) : Pratyakshik Bhugol, Sudarshan – Nashik
3. P. G. Saptarshi and S. R. Jog, Statistical Methods
4. S. N. Karlekar, (2008) : Statistical Methods, Diamond – Pune
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Six Months Module Syllabus for Environmental Studies for Under Graduate Courses

UNIVERSITY GRANTS COMMISSION
BAHADURSHAH ZAFAR MARG
NEW DELHI- 110 002

2003

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VISION

The importance of environmental science and environmental studies cannot be disputed. The need for sustainable development is a key to the future of mankind. Continuing problems of pollution, loss of forest, solid waste disposal, degradation of environment, issues like economic productivity and national security, Global warming, the depletion of ozone layer and loss of biodiversity have made everyone aware of environmental issues. The United Nations Conference on Environment and Development held in Rio de Janerio in 1992 and world Summit on Sustainable Development at Johannesburg in 2002 have drawn the attention of people around the globe to the deteriorating condition of our environment. It is clear that no citizen of the earth can afford to be ignorant of environmental issues. Environmental management has captured the attention of health care managers. Managing environmental hazards has become very important.

Human beings have been interested in ecology since the beginning of civilization. Even our ancient scriptures have emphasized about practices and values of environmental conservation. It is now even more critical than ever before for mankind as a whole to have a clear understanding of environmental concerns and to follow sustainable development practices.

India is rich in biodiversity which provides various resources for people. It is also basis for biotechnology.

Only about 1.7 million living organisms have been described and named globally. Still many more remain to be identified and described. Attempts are made to conserve them in ex-situ and in-situ situations. Intellectual property rights (IPRs) have become important in a biodiversity-rich country like India to protect microbes, plants and animals that have useful genetic properties. Destruction of habitats, over-use of energy resources and environmental pollution have been found to be responsible for the loss of a large number of life-forms. It is feared that a large proportion of life on earth may get wiped out in the near future.

Inspite of the deteriorating status of the environment, study of environment has so far not received adequate attention in our academic programmes. Recognizing this, the Hon'ble Supreme Court directed the UGC to introduce a basic course on environment at every level in college education. Accordingly, the matter was considered by UGC and it was decided that a six months compulsory core module course in environmental studies may be prepared and compulsorily implemented in all the Universities/Colleges of India.

The experts committee appointed by the UGC has looked into all the pertinent questions, issues and other relevant matters. This was followed by framing of the core module syllabus for environmental studies for undergraduate courses of all branches of Higher Education. We are deeply conscious that there are bound to be gaps between the ideal and real. Genuine endeavour is required to minimize the gaps by intellectual and material inputs. The success of this course will depend on the initiative and drive of the teachers and the receptive students.

Members of the Expert Committee on Environmental Studies

1. Prof. Erach Bharucha
   Director
   Bharati Vidyapeeth
   Institute of Environment Education &
   Research, Pune

2. Prof. C. Manoharachary
   Department of Botany
   Osmania University
   Hyderabad

3. Prof. S. Thayumanavan
   Director
   Centre for Environmental Studies
   Anna University, Chennai

4. Prof. D.C. Goswami
   Head, Deptt. of Environment Science
   Gauhati University
   Guwahati-781 014

5. Shri R. Mehta
   Director EE Division
   Ministry of Environment & Forest
   Prayavaran Bhawan, CGO Complex
   Lodhi Road, New Delhi-110 003

UGC OFFICIALS

6. Dr. N.K. Jain
   Joint Secretary
   UGC, New Delhi

e) Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies.

f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

(8 lectures)

Unit 3 : Ecosystems

- 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, characteristic 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)

(6 lectures)

Unit 4 : Biodiversity and its conservation

- Introduction – Definition : genetic, species and ecosystem diversity.
- Biogeographical classification of India
- Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation
- 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.

(8 lectures)

Unit 5 : Environmental Pollution

Definition

- Causes, effects and control measures of :-
  a. Air pollution
  b. Water pollution
  c. Soil pollution
  d. Marine pollution

e. Noise pollution

f. Thermal pollution

g. Nuclear hazards

- Solid waste Management : Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Diaster management : floods, earthquake, cyclone and landslides.

(8 lectures)

Unit 6 : Social Issues and the Environment

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rahabilitation of people : its problems and concerns. Case studies.
- Environmental ethics : Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act
- Air (Prevention and Control of Pollution) Act.

- Water (Prevention and control of Pollution) Act
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation.
- Public awareness.

(7 lectures)

Unit 7 : Human Population and the Environment

- Population growth, variation among nations.
- Population explosion – Family Welfare Programme.
- Environment and human health.
- Human Rights.
- Value Education.
- HIV / AIDS.
- Women and Child Welfare.
- Role of Information Technology in Environment and human health
- Case Studies.

(6 lectures)

Unit 8 : Field work

- Visit to a local area to document environmental [illegible] grassland / hill / mountain

- Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours)

SIX MONTHS COMPULSORY CORE MODULE COURSE IN ENVIRONMENTAL STUDIES: FOR UNDERGRADUATES

Teaching Methodologies.

The Core Module Syllabus for Environmental Studies includes class room teaching and Field Work. The syllabus is divided into eight units covering 50 lectures. The first seven units will cover 45 lectures which are class room based to enhance knowledge skills and attitude to environment. Unit eight is based on field activities which will be covered in five lecture hours and would provide students first hand knowledge on various local environmental aspects. Field experience is one of the most effective learning tools for environmental concerns. This moves out of the scope of the text book mode of teaching into the realm of real learning in the field, where the teacher merely acts as a catalyst to interpret what the student observes or discovers in his/her own environment. Field studies are as essential as class work and form an irreplaceable synergistic tool in the entire learning process.

Course material provided by UGC for class room teaching and field activities be utilized.

The universities/ colleges can also draw upon expertise of outside resource persons for teaching purposes.

Environmental Core Module shall be integrated into the teaching programmes of all undergraduate courses.

Annual System: The duration of the course will be 50 lectures. The exam will be conducted along with the Annual Examination.

Semester System: The Environment course of 50 lectures will be conducted in the second semester and the examinations shall be conducted at the end of the second semester.

Credit System: The core course will be awarded 4 credits.

Exam Pattern: In case of awarding the marks, the question paper should carry 100 marks. The structure of the question paper being:

Part-A, Short answer pattern	-	25 marks
Part-B, Essay type with inbuilt choice	-	50 marks
Part-C, Field Work	-	25 marks

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22. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines , Compliances and Standards, Vol I and II, Enviro Media (R)

23. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science Publications (TB)

24. Wagner K.D.,1998. Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p

(M) Magazine

(R)Reference

(TB) Textbook

UNIVERSITY OF PUNE
BOARD OF STUDIES IN ZOOLOGY

Revised Syllabus for S. Y. B. Sc. (Zoology) To be implemented from June, 2014

S.Y. B. Sc. (Zoology) New Syllabus

Semester-I

Paper I- ZY-211: Animal Systematics and Diversity – III

Paper II- ZY-212: Applied Zoology – I

Semester-II

Paper I- ZY-221: Animal Systematics and Diversity – IV

Paper II- ZY-222: Applied Zoology – II

Semester-I and II (Annual Examination)

Paper III- ZY-223: Practical course (Corresponding to Theory papers)

UNIVERSITY OF PUNE
BOARD OF STUDIES IN ZOOLOGY
COURSE STRUCTURE OF UNDERGRADUATE CLASSES

Class: F.Y. B. Sc. (To be implemented from June 2013)

Paper	Course No.	Term I	Term II
I	ZY 101	Animal Systematics and Diversity -I	Animal Systematics and Diversity –II
II	ZY 102	Fundamentals of Cell Biology	Genetics
III	ZY 103	Practical course	

Class: S.Y. B. Sc. (To be implemented from June 2014)

Paper	Course No.	Semester I	Course No.	Semester II
I	ZY.211	Animal Systematics and Diversity -III	ZY. 221	Animal Systematics and Diversity –IV
II	ZY.212	Applied Zoology I	ZY.222	Applied Zoology II
III	ZY.223	Practical course		

Class: T.Y. B. Sc. (To be implemented from June 2015)

Paper	Course	Semester III	Course	Semester IV
I	ZY.331	Animal Systematics and Diversity V	ZY.341	Biological Techniques
II	ZY.332	Mammalian Histology	ZY.342	Mammalian Physiology and Endocrinology
III	ZY.333	Biological Chemistry	ZY.343	Genetics and Molecular Biology
IV	ZY.334	Environmental Biology and Toxicology	ZY.344	Organic Evolution
V	ZY.335	Parasitology	ZY.345	General Embryology
VI	ZY.336	General Pathology or Cell Biology	ZY.346	Public Health and Hygiene or Medical Entomology
VII	ZY.347	Practicals corresponding to ZY 331, ZY 332, ZY 341 & ZY 342		
VIII	ZY.348	Practicals corresponding to ZY 333, ZY 334, ZY 343 & ZY 344		
IX	ZY.349	Practicals corresponding to ZY 335, ZY 336, ZY 345 & ZY 346		

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Prin. (Dr) D. K. Mhaske
Chairman, B.O.S. in Zoology
University of Pune

University of Pune

Draft of Syllabus to be implemented from June 2014

S. Y. B. Sc. Zoology

Semester-I

Paper I- ZY-211: Animal Systematics and Diversity – III

Paper II- ZY-212: Applied Zoology – I

Semester-II

Paper I- ZY-221: Animal Systematics and Diversity – IV

Paper II- ZY-222: Applied Zoology – II

Semester-I and II (Annual Examination)

Paper III- ZY-223: Practical course (Corresponding to Theory papers)

Equivalence of Previous Syllabus:

Semester	**Old Course (2009 Pattern)**	**New Course (2014 Pattern)**
Semester-I	Paper I: General Zoology and Biological Techniques-I	Paper I: Animal Systematics and Diversity –III
Semester-I	Paper II: Applied Zoology-I	Paper II: Applied Zoology-I
Semester-II	Paper I: General Zoology and Biological Techniques-II	Paper I: Animal Systematics and Diversity –IV
Semester-II	Paper II: Applied Zoology-II	Paper II: Applied Zoology-II
Annual Examination	Paper III: Practical course	Paper III: Practical course

PAPER I: FIRST SEMESTER

ZY-211: ANIMAL SYSTEMATICS AND DIVERSITY -III

1. **Salient features and classification upto classes of the following: (any two examples from each class) :** **15**

   1.1 Arthropoda :- Crustacea, Arachnida, Insecta, Myriapoda, Onychophora.

   1.2 Mollusca:- Aplacophora, Gastropoda, Pelecypoda, Scaphopoda, Cephalopoda.

   1.3 Echinodermata:- Asteroidea, Ophuroidea, Holothuria, Echinoidea, Crinoidea.

2. **Study of following with reference to:** **15**

   2.1 Arthropoda:- Mouthparts in Insects, Metamorphosis in Insects, Mimicry in Insects,

   Economic importance of Insects, Larval forms in Crustacea

   2.2 Mollusca:- Economic importance of mollusc, Shell and foot modification in mollusc,

   Torsion and Detorsion in mollusc, Larval forms in molluscs

   2.3 Echinodermata:- Origin of Echinodermata, Types of Pedicellariae, Larval forms in Echinodermata,

3. **Study of Starfish :** **18**

   4.1 Systematic position, Habit and habitat

   4.2 External characters

   4.3 Digestive system

   4.4 Water vascular system

   4.5 Reproductive system

   4.6 Autotomy and regeneration

PAPER –I: SECOND SEMESTER

ZY-221: ANIMAL SYSTEMATICS AND DIVERSITY – IV

1. Salient features of following classes and its subclasses with two examples of each: **12**

- **1.1** Reptilia
- **1.2** Aves
- **1.3** Mammalia

2. General topics: **16**

- **2.1** Poisonous and non-poisonous snakes (Two examples each)
- **2.2** Desert adaptations in reptiles in brief.
- **2.3** Beak and feet modifications in birds
- **2.4** Migration in birds
- **2.5** Aerial adaptations in birds
- **2.6** Egg laying mammals
- **2.7** Aquatic mammals

3. Study of *Scoliodon* : **20**

- **3.1** Systematic position, Habit and habitat
- **3.2** External characters
- **3.3** Digestive system, food, feeding and physiology of digestion
- **3.4** Respiratory system
- **3.5** Blood vascular system
- **3.6** Nervous system and sense organs
- **3.7** Male urinogenital system and female reproductive system

PAPER II: FIRST SEMESTER

ZY-212: APPLIED ZOOLOGY – I

1. Fisheries :

1.1 An introduction to fisheries and its types (in brief) : Freshwater fisheries, Marine fisheries, Brackish water fisheries. **2**

1.2 Different types of ponds used in fishery : Nursery pond, Rearing pond Stock pond **2**

1.3 Habit, habitat and culture methods of following freshwater forms : **10**

- **a)** Rohu (*Labeo rohita*)
- **b)** Catla (*Catla catla*)
- **c)** Mrigal (*Cirrhinus mrigala*)
- **d)** Giant prawn (*Macrobrachium rosenbergi*)

1.4 Harvesting methods of following marine forms : **4**

- ***a)*** *Harpadon*
- **b)** Mackerel
- **c)** Lobster
- **d)** Pearl oyster

1.5 Crafts and gears in Indian Fishery : **2**

a) Crafts – Catamaran, Machwa, Dinghy, Dug out canoe, Built –up boat
Gears – Gill net, Dol net, Purse net, Rampani net, Cast net

1.6 Fishery byproducts : **2**

- **a)** Fish meal
- **b)** Fish flour
- **c)** Liver oil
- **d)** Ising glass
- **e)** Fish glue
- **f)** Fish manure
- **g)** Fish fin soup

1.7 Fish preservation technique : **2**

- **a)** Chilling
- **b)** Freezing
- **c)** Salting
- **d)** Drying
- **e)** Canning

2. Agricultural Pests and their control :

2.1 An introduction to Pest, types of pests (agricultural, household, stored grain, structural, veterinary, forestry and nursery) **2**

2.2 Major insect pests of agricultural importance (Marks of identification, life cycle, nature of damage and control measures) **9**

- **a)** Jowar stem borer
- **b)** Red cotton bug
- **c)** Brinjal fruit borer
- **d)** Mango stem borer
- **e)** Pulse beetle
- **f)** Rice weevil

2.3 Non insect pest : Rats and Bandicoots, Crabs, Snails, Slugs, Birds and Squirrels **2**

2.4 Pest control practices in brief : Cultural control, Physical control, Mechanical control, Chemical control, Biological control, Pheromonal control and Concept of IPM in brief **6**

2.5 Plant protection appliances : Rotary duster, Knapsack sprayer, Cynogas Pump. **3**

2.6 Hazards of pesticides on human and antidotes. **2**

PAPER II: SECOND SEMESTER

ZY-222: APPLIED ZOOLOGY – II

1. Apiculture :

1.1 An introduction to Apiculture, Study of habit, habitat and nesting behavior of *Apis dorsata*, *Apis indica*, *Apis florae* and *Apis mellifera*. **3**

1.2 Life cycle, Colony organization and division of labour, Polymorphism **3**

1.3 Bee behaviour and bee communication. **3**

1.4 Bee keeping equipments : **a)** Bee box (Langstroth type) **b)** Honey extractor **c)** Smoker **d)** Bee-veil **e)** Gloves **f)** Hive tool **g)** Bee Brush **h)** Queen excluder **3**

1.5 Bee keeping and seasonal management. **2**

1.6 Bee products (collection methods, composition and uses: **a)** Honey **b)** Wax **c)** Bee Venom **d)** Propolis **e)** Royal jelly **f)** Pollen grains **4**

1.7 Diseases and enemies of Bees:

a) Bee diseases – Protozoan, Bacterial, Viral, Fungal – with two examples.

b) Bee pests – Wax moth (Greater and Lesser), Wax beetle.

c) Bee Enemies – Bee eater, King crow, Wasp, Lizard, Bear, Man. **5**

1.8 Bee pollination **1**

2. Sericulture :

2.1 An introduction to sericulture, Study of different types of silk moths, their distribution and varieties of silk produced by Mulberry, Tassar, Eri and Muga silk worms in India. **4**

2.2 External morphology and life cycle of *Bombyx mori*. **3**

2.3 Cultivation of mulberry (moriculture): **a)** Varieties for cultivation, **b)** Rainfed and irrigated mulberry cultivation – Fertilize schedule, Prunning methods and leaf yield. **4**

2.4 Harvesting of mulberry: **a)** Leaf plucking **b)** Branch cutting **c)** Whole shoot cutting. **2**

2.5 Silk worm rearing: **a)** Types of rearing **b)** Rearing house **c)** Rearing techniques **d)** Important diseases and pests. **7**

2.6 Post harvest processing of cocoons:

a) Harvesting and Preparation of cocoons for marketing

b) Stiffling, Sorting, Storage, Deflossing and Riddling

c) Cocoon cooking, Reeling Equipment and Rereeling, Washing and Polishing. **4**

PAPER III: FIRST AND SECOND SEMESTER

ZY-223: PRACTICAL COURSE

Practical 1.	Study and classification with reasons of the following animals Phylum Arthropoda:- Scorpion, Crab, Cockroach, Head louse, Centipede, Peripatus	(D)
Practical 2.	Study and classification with reasons of the following animals Phylum Mollusca:- Chiton, Snail, Bivalve, Dentalium, Octopus,	(D)
Practical 3.	Study and classification with reasons of the following animals Phylum Echinodermata:- Star fish, Brittle star, Holothuria, Sea Urchin, Echinus	(D)
Practical 4.	Study of permanent slides of mouthparts of the following insects : Cockroach, Mosquito, Plant bug/Bed bug, Butterfly, Honey Bee and Housefly	(D)
Practical 5.	A) Study of Shell:- Chiton, Pila, Sepia, Pecten, Dentalium, B) Study of Foot:- Chiton,Patella, Aplysia, Sepia, Octopus, Dentalium	(D)
Practical 6.	To Study the external characters and digestive system of *starfish*.	(E)
Practical 7.	A) Study of water vascular system of *starfish*. B) Temporary preparation of gonads from *starfish.*	(E) (E)
Practical 8.	A) Study of permanent slides of T. S. of arm and types of pedicellariae of *starfish*. B) Larval forms in Echinodermata.	(D) (D)
Practical 9.	Identification, Classification and study of habit, habitat and economic importance of the following: a) Rohu, Catla, Mrigal, Pomphret. b) Prawn, Crab, Oyster.	 (D) (D)
Practical 10.	Study and maintenance of Aquarium.	(E)
Practical 11.	Study of any three types of crafts and gears in fishing.	(D)
Practical 12.	Study of insect pests with respect to marks of identification, nature of damage and economic importance (Examples related to theory course)	(D)
Practical 13.	Study of pest control appliances (Sprayer/Duster)	(D)
Practical 14.	Study and classification with reasons of the following animals Class Reptilia – Cobra, Garden lizard, Turtle, Rat snake, Draco	(D)

Practical 15.	Study and classification with reasons of the following animals Class Aves – Sparrow, Crow, Parrot, Woodpecker Class Mammals – Rabbit, Mungoose, Kangaroo	(D)
Practical 16.	Identification of Poisonous and non- poisonous snakes with the help of identification key with two examples of each	(D)
Practical 17.	Study of modifications of beaks and feet in birds (Museum specimen) a) Beaks: tearing and piercing, fruit eating, mud probing, fish catching, wood chiseling and flower probing. b) Feet: perching, raptorial, climbing, swimming, running.	(D)
Practical 18.	Study of external characters and digestive system of *Scoliodon*.	(E)
Practical 19.	Study of brain of *Scoliodon*	(E)
Practical 20.	a) Temporary preparation of placoid scales from *Scoliodon*	(E)
	b) Study of cranial nerves, eye ball muscles of *Scoliodon*	(D)
	c) Study of Membranous labyrinth of *Scoliodon*	(D)
Practical 21.	a) Study of life cycle of Honey bee	(D)
	b) Study of mouth parts, thoracic appendages (legs and wings) and sting apparatus of Honey bee	(E)
Practical 22.	Study of various bee keeping equipments	(D)
Practical 23.	Study of: a) bee products, b) bee pests, d) bee enemies	(D)
Practical 24.	a) Study of life cycle of *Bombyx mori*.	(D)
	b) Study of any five equipments in Sericulture.	(D)
Practical 25.	Compulsory submission of field visit report along with at least five Photographs/ sketches of insect pest/fishes/any animal corresponding to theory courses	
Practical 26.	Compulsory study tour/visit to sea coast/fishery institute/sericulture farm/ apiculture institute / agricultural farm.	

Practical Skeleton Paper

Class – S.Y.B.Sc. **Subject – Zoology**

Time – 10.00 am onwards **Max. Marks – 80**

Q.1 – Dissect Starfish/*Scoliodon* so as to expose its.……system. (16)

Q.2 – Make a stained temporary preparation of ……

from Honey bee/Starfish/*Scoliodon* (10)

Q.3 – Identification (Non-chordates and Chordates) (21)

a) Identify and classify giving reasons (Arthropoda)

b) Identify and classify giving reasons (Mollusca/Echinodermata)

c) Identify and classify giving reasons (Cyclostomata/Reptiles)

d) Identify and classify giving reasons (Aves/Mammals)

e) Identify and describe the types of mouthparts of insect

f) Identify and describe (Shell/Foot of mollusca/Poisonous/Non poisonous snake)

g) Identify and comment on its modifications (Beak/feet modifications in birds)

Q.4 – Identification (Applied Zoology) (18)

a) Identify and give its economic importance (Any fish)

b) Identify and describe (Any gear/craft)

c) Identify and give its application (Plant protection appliance)

d) Identify and describe (One stage of life cycle of honeybee/silkworm)

e) Identify and describe (Sericulture equipment)

f) Identify and describe (Bee keeping equipment/Bee product)

Q.5 – a) Tour report and Certified Journal (05)

b) Viva- voce (05)

Q.6- Submission of field visit report along with five photographs/sketches of insect pest/fishes/any animal (05)

REFERENCES:

ZY-211 Animal Systematics and Diversity - III

1. Text Books of Zoology. Vol.11, Invertebrates, 1982, A. J. Marshall And W. D. Williams, ELSB And Macmillan, Hongkong.
2. Life of Invertibrates, 1980, S. N. Prasad, Vikas Publishing Co. Sahldabad.
3. The Invertibrates, Echinodermata Vol- IV 1992, L.H. Hyman, International books and periodicals supply services Dehli.
4. Invertebrate Zoology, 1982, R. D. Barnes, Saunders College, Philadelphia.
5. Text Books of Zoology, Invertibrates Vol- II, 1992, T.J.Parker and W.A. Haswel, Edited by Marshall and Williams, CBS publications and distribution, New Dehli.
6. Invertibrates Zoology, E.L. Jordon and P.S. Verma; S. Chand and Co. Ltd., New Dehli. 14th fully Revised Edition- 2007.
7. Invertebrate Zoology, 1991, Paul, A. Meglitch and Fedricks R. Schram, Oxford University Press, New York.
8. IGCSE Biology, D. G. Mackean, Published by John Murray, London. UK, 2002.
9. Invertebrate Zoology, Edited by D. T. Anderson, Oxford University Press, New York.- Indian Edition by- A.P. Offset, Dehli, 2006.
10. Diversity of Organisms. Edited by Caroline M., Pond Biology- Form and Function. Published by Hodder and Stoughton, The Open University, London.
11. An Introduction to Mollusca. H. S. Bhamrah, Kavita Juneja. Anmol Publications Pvt. Ltd. New Dehli- 110002 (India).
12. An Introduction of Echinodermata. . H. S. Bhamrah, Kavita Juneja. Anmol Publications Pvt. Ltd. New Dehli- 110002 (India).
13. Modern Text Book Of Zoology. Invertibrates. 6th Edition, 1992, R. L. Kotpal, Rastogi Publication, Merut.

ZY- 212 Applied Zoology Part- I

Fisheries & Agricultural pests and their Control

1. Fishes . Mary Chandy. N.B.T. India, 2005.
2. Economic Zoology, Shukla Upadhyay, Rastogi Publication, Meerut, India, 1998.
3. Fisheries Developments, K.K. Trivedi, Oxford and IBH Pub. Co.
4. Marine Fishes in India, 1990, D.V.Bal & K. Virabhdra, tata McGraw Hill Publication.
5. Fishery Management, 1990, S.C.Agarwal, Avinash Publication House, New Dehli.

6. Entomology & Pest Management. Pedigo L.P. Prentice Hall, India 1996.
7. General & Applied Entomology, Nayar K.K. & T.N. Ananthkrishnan & B.V.Davis, Tata McGraw Hill Publication, New Dehli.
8. Insects. M.S. Mani, NBT, India, 2006.
9. Agricultural Pests: Biology & Control Measures, B.M.Deoray and T.B.Nikam, Nirali Publication, Pune, 1990.
10. Insects & Mites of Crops in India. M.R.G.K. Nair – by ICAR, New Dehli.
11. Ihe Science of Entomology. W.S.Romosor and J.G. Stoffolano, McGraw Hill Publication, 1988.
12. Agricultural Insect Pests of India and their Control, Dennis S.Hill, Cambridge University Press.
13. Applied Entomology. Vol. I & II. K.P. Srivastava. Kalyani Publication, Ludhiyana, New Dehli.
14. Principles of Insect Pest Management. G.S. Dhaliwal and Ramesh Arora, Kalyani Publications, Ludhiyana.
15. Pest Management and Pesticides: Indian Scenario. Editor- B. Vasantaraj David, Namrutha Publications, Madras (Chennai).
16. Concepts of Insect Control. Ghosh M.R. Wiley Eastern Ltd. New Dehli.

ZY- 221 Animal Systematics and Diversity - IV

1. A Text Book of Zoology, Vertebrates, Vol-II, Jeffery Parker and W.A. Haswel, Edited by Marshall and Williams, CBS Publication, New Dehli.
2. Chordate Zoology, 1982, P.S Dhami and J.K.Dhami, R.Chand and Co., New Dehli.
3. A Text Book of Zoology, 1984, R.D. Vidyarthi, R. Chand and Co., Dehli.
4. Modern Text Book of Zoology, Vertibrates. R. L. Kotpal, 3rd edn. Rastogi Publications, Meerut.
5. Chordate Zoology, E.L. Jordon. S. Chand & Co., New Dehli.
6. Organic Evolution. R.S. Lull. Light & Life Publishers.
7. Organic Evolution, 1991, T.S. Gopalkrishna. Itta Sambashivarab Publ. House, Dehli.
8. Human Physiology, Vol.I & II, 1980, Edn. Dr. C.C. Chatterjee, Medical applied agency, Calcutta.
9. Biology, Campbell nand Reece. 7th Edn. Pearson Education in South Asia, Dehli.

ZY-222 Applied Zoology Part-II

Apiculture and Sericulture

1. Destructive and useful Insects, their habit and Control, 1973. C.L. Metcalf and W. p. Flint, Tata McGraw Hill Publications, New Dehli.
2. A Text Book Of Entomology, 1974. V.K. Mathur and K.D. Upadhayay, Goel Printing Press, Barani.
3. Imm's Text Book of Entomology, Vol I & II, Richard and Owen.
4. Biology of Insects, 1992. S.C. Saxena. Oxford and IBH Publishing Co., New Dehli. Bombay, Calcutta.
5. Bee and Bee Keeping, 1978, Roger A. Morse, Conell University Press, London.
6. The Behaviour & Social Life of Honey Bees, C.R. Ribbandas, Dover Publication inc. New York.
7. Principal of Sericulture, 1994. Hisao Arguo, Oxford & Co.
8. An Introduction of Sericulture, 1995. G.Ganga, J. Sulochana, Oxford & IBH Publication Co. Bambay.
9. FAQ Manual of Sericulture. Vol I Mulberry Cultivation, Vol II Silkworm Rearing. Central Silk Board, Bangalore.

ZY- 223 Practical Courses

1. Invertebrates Practical Zoology. V. Banerjee. Bharati Bhavan, Patana, 1997
2. Practical Zoology. Invertebrate / Vertebrate. S. S. Lal, Rastogi Publications. Meerut, India, Uttar Pradesh, 1998.
3. Experimental Physiology. V. V. Kulshreshtha. Vikas Publishing House Pvt. Ltd, New Delhi.
4. Practical Course in Biological Chemistry. Bhide, Diwan and Athavle, Narendra Prakashan.
5. A Manual of Practical Zoology, Vol I Non-Chordata, 1994. P.K.G Nair and K. P Aehar. Himalaya Publishing House, Bombay, Delhi, Nagpur.
6. A Manual of Practical Zoology, Vol II Non-Chordata, 1994. P.K.G Nair and K. P Aehar. Himalaya Publishing House, Bombay, Delhi, Nagpur.
7. A Manual of Practical Zoology, Invertebrate, 1975. P. Verma, S. Chand and Co., New Delhi..

8. Practical Invertebrate Zoology, 1972. V. S. Shrivastava. Central Book Depot, Allahabad.
9. A Manual of Practical Vertebrate Zoology and Physiology, 1990. V. B. Rastogi, Kedarnath, Ramnath, Meerut, Delhi.
10. Practical Bee keeping, Herbert Mace. Ward Lock Limited, London.
11. Handbook of Practical Sericulture, 1987. S. R. Uttal and M.N. Narsimhana, Central Silk Board, Bangalore.

UNIVERSITY OF PUNE

REVISED SYLLABUS FOR S.Y. B.Sc. CHEMISTRY FROM 2014-2015

(According to Semester system 2014-2015)

Course structure: There will be four theory papers of 50 Marks each, (40 marks external + 10 marks internal) and one practical course of 100 marks. (80 marks External + 20 marks Internal). The examination will be held semester-wise for theory papers whereas the examination for practical course CH-223 will be held at the end of **SEMETER-II**

SEMESTER	PAPER	COURSE TITLE	MARKS
I	CH-211	PHYSICAL & ANALYTICAL CHEMISTRY	50
I	CH-212	ORGANIC & INORGANIC CHEMISTRY	50
II	CH-221	PHYSICAL & ANALYTICAL CHEMISTRY	50
II	CH-222	ORGANIC & INORGANIC CHEMISTRY	50

Practical Course in Chemistry: CH-223 - 100 Marks

Equivalence of Previous Syllabus:

Semester	Old Course (2009-10)	New Course (2014-15)
I	CH-211 : Physical Chemistry	CH-211 : Physical & Analytical Chemistry
I	CH-212 : Organic Chemistry	CH-212 : Organic & Inorganic Chemistry
II	CH-221 : Inorganic Chemistry	CH-222 : Organic & Inorganic Chemistry
II	CH-222 : Analytical Chemistry	CH-221 : Physical & Analytical Chemistry
	CH- 223: Practical	CH- 223: Practical

S. Y. B. Sc. (Chemistry) Syllabus

Semester - I

Paper 1: CH-211: Physical and Analytical Chemistry

Paper 2: CH-212: Organic and Inorganic Chemistry

Semester - II

Paper 3: CH-221: Physical and Analytical Chemistry

Paper 4: CH-222: Organic and Inorganic Chemistry

Practical Course in Chemistry CH-223 (To be conducted during both semesters)

SEMESTER – I

Paper 1: CH-211

Section – I

Physical Chemistry

Chapter 1: Elementary Chemical Kinetics **[10]**

Introduction to Chemical kinetics, molecularity and order of reaction , reaction rates, rate laws, rate constant and its significance, Integrated rate law expression and its characteristics–first order, second order (single reactant, two reactants involved), examples of 1^{st} and 2^{nd} order reaction, pseudomolecular reactions, factors affecting rate of reaction, measurement of rate of reaction, numericals.

Aim: To introduce concept of kinetics at undergraduate level.

Objectives: Student should learn

i. Concept of kinetics , terms used , rate laws , types of order
ii. Discuss examples of first order and second order reaction
iii. Pseudo molecular reactions
iv. Factors affecting on rate of reaction
v. Techniques of measurement of rate of reaction
vi. To solve problems

Chapter 2: Photochemistry **[10]**

Introduction, thermal reactions and photochemical reactions, laws of photochemistry, quantum yield, measurement of quantum yield, types of photochemical reactions-photosynthesis, photolysis, photocatalysis, photosensitization, photophysical process–fluorescence, phosphorescence, quenching, chemiluminiscence, numericals.

Aim: To impart basic knowledge of photochemistry and its applications

Objectives: After studying the chapter student should be able to

i. Know about photochemistry
ii. Understand difference between thermal and photochemical reactions
iii. Understand laws of photochemistry
iv. Learn what is quantum yield and it's measurement
v. Know Types of photochemical reactions and photophysical process
vi. Know about quenching and chemiluminence
vii. To solve numericals

Chapter 3: Distribution law **[04]**

Nernst distribution law, Statement and thermodynamic proof for Nernst distribution law, association and dissociation of solute in solvent, application of distribution law, Numericals.

Aim: To understand Nernst Distribution Law and its applications

Objectives: Students should learn

i. Concept of distribution of solute amongst pair of immiscible solvents
ii. Distribution law and it's thermodynamic proof
iii. Distribution law and nature of solute in solution state
iv. Application – Solvent extraction
v. To solve numericals

Ref.1: Page no. 298 to 302 and 775-800

Section – II

Analytical Chemistry

Chapter 4: Introduction to Analytical Chemistry **[3]**

Introduction, Chemical analysis, applications of chemical analysis, sampling, types of analysis, Common techniques, Instrumental methods, other techniques, factors affecting on choice of method

Aim: To introduce basics of analytical chemistry

Objectives: Students should learn

i. What is Analytical Chemistry
ii. Chemical analysis and its applications
iii. Sampling
iv. Common techniques
v. Instrumental methods and other techniques
vi. Choice of method

Ref: Vogel chapter 1 (Page 1 - 11) up to section 1.9 except use of literature.

Chapter 5: Errors in Quantitative Analysis **[5]**

Introduction, Error, Accuracy, precision, methods of expressing accuracy and precision, classification of errors, significant figures and computations, distribution of random errors, mean and standard deviations, reliability of results, Numericals.

Aim: To understand errors and its interpretation

Objectives: Students should learn

i. Meaning of error and terms related to expression & estimation of errors
ii. Methods of expressing accuracy and precision
iii. Classification of errors
iv. Significant figures and computations
v. Distribution of errors
vi. Mean and standard deviations
vii. Reliability of results

Ref: Vogel, 5thedn chapter 4 (127-137 up to section 4.10) extended up to 4.13

Chapter 6: Inorganic Qualitative Analysis [8]

Basic principle, common ion effect, solubility, solubility product, preparation of original solution, classification of basic radicals in groups, separation of basic radicals, removal of interfering anions (phosphate and borate), detection of acid radicals.

Aim: To study the theory underlying Inorganic Qualitative analysis

Objectives: A student should know

i. Basic principles in qualitative analysis
ii. Meaning of common ion effect
iii. Role of common ion effect and solubility product
iv. Different groups for basic radicals
v. Group reagent and precipitating agents
vi. Interfering anions and its removal
vii. Separation for basic radicals
vii. Method of detection of acidic radicals

Chapter 7: Analysis of Organic Compounds (Qualitative & Quantitative) [8]

I. Qualitative

A. Types of organic compounds, Characteristic tests and classifications, reactions of different functional groups, analysis of binary mixtures.

II Quantitative

B. Analysis–estimation of C, H, (O) by combustion tube, detection of nitrogen, sulfur, halogen and phosphorous by Lassigen's test.

C. Estimation of nitrogen by Dumas's Kjeldahl's method, estimation of halogen, sulphur and phosphate by Carious method.

D. Determination of empirical and molecular formula, numerical problems.

Aim: To disseminate knowledge of qualitative & quantitative analysis of organic compounds

Objectives: A student should know-

i. Classification of compounds with different functional groups
ii. Different tests for detection of elements like C, H, (O), N, S & P.
iii. Characteristic tests for different functional groups
iv. Different colour tests and the reactions
v. Quantitative analysis of C, H by Liebig's method
vi. Kjeldahl's method with example
vii. Carius tube method with example
vii. Empirical and molecular formula
vii. To solve numericals.

Name of the reference book:

1. Analytical Chemistry by G.D. Christian, sixth edition. Pages: 1-10
2. Vogel's textbook of Quantitative Analysis, sixth edition
   J. Mendham, R.C. Denney, J.D. Barnes, MJK Thomas
3. A textbook of macro & semi micro qualitative analysis by
   A.J. Vogel, fifth edition
4. Quantitative Organic Analysis, fourth edition, A.J. Vogel, ELBS

Paper 2: CH-212

Section – I

Organic Chemistry

Chapter 1: Stereoisomerism **[12]**

Introduction to optical isomerism: Chirality, optical activity and polarimetry, enantiomers, absolute configuration, R/S system nomenclature with wedge and Fischer representation of two chiral centres, erythro, threo, meso-diastereomers with R/S configuration. Stereoisomerism Baeye'rs strain theory, heat of combustion, cycloalkanes, factors affecting the stability of conformation, Conformation of cyclohexane - equatorial and axial bonds, Monosubstituted cyclohexane stability with $-CH_3$ and $-C(CH_3)_3$ substitutes. Structures of geometrical isomers of dimetylcyclohexane only.

Ref. 3

Aims and Objectives

Students should be able to –

i) Identify chiral center in the given organic compounds.

ii) Define Erythro, threo, meso, diasteroisomers with suitable examples.

iii) Able to find R/S configuration in compounds containing two chiral centers.

iv) Explain Bayer's strain theory, Heat of combustion and relates stability of cycloalkanes.

v) Explain the stability of cyclohexanes.

vi) Draw the structure of boat and chair configuration of cyclohexane.

vii) Draw axial and equatorial bonds in cyclohexane.

viii) Draw structure of conformations of mono- & disubstituted cyclohexanes

ix) Explain the stability of axial and equatorial conformation of monosubstituted cyclohexanes.

Chapter 2: Organic reaction Mechanism **[12]**

Introduction, types of reagents–electrophile, nucleophile and free radical.

Types of organic reactions: Addition, Elimination (β-elimination and Hofmann elimination), substitution (aliphatic electrophilic and nucleophilic, aromatic electrophilic) and rearrangement.

Mechanism: (i) Aldol condensation (ii) Markovnikov and anti-Markovnikov addition reaction (iii) Saytzeff and Hoffmann elimination (iv) S_N1 and S_N2 reactions (v) Hofmann rearrangement.

Ref. 1 & 4

Aims and Objectives

Students should be able to –

i) Define and classify heterocyclic compounds.

ii) Use Huckel rule to predict aromaticity.

iii) Suggest synthetic route for preparation of various heterocyclic compounds.

iv) Write and complete various reactions of heterocyclic compounds.

v) Predict products.

Reference Books:

Ref. 1: Organic Chemistry-6h Ed. Morrison and Boyd Prentice Hall of India Prt Ltd,New Delhi-2001.

Ref. 2: Outline of Biochemistry 5h Ed., Conn, Stumpf Bruening and Roy Doi John Wiley 1987.

Ref. 3: Stereochemistry of carbon compounds - E. L. Eliel

Ref. 4: Reactions, rearrangements and reagents – S N Sanyal

Section – II

Inorganic Chemistry

Chapter 3: General Principles of Metallurgy: [6]

Introduction, occurrence of metals, ores and minerals, types of ores, operations involved in metallurgy, crushing, connotation, various methods of concentration such as hand picking, gravity separation, magnetic separation. Froth flotation, Calcinations, Roasting etc. Reduction, various methods of reduction such as smelting, Aluminothermic process and electrolytic reduction, Refining of metals, various methods of refining such as poling, liquation, electrolytic and vapour phase refining (Van Arkel Process).

Aims: To study principles and process of metallurgy.

Objectives: A student should be able -

i) To differentiate between ore and minerals.

ii) To differentiate between calcination and roasting and smelting.

iii) To know the different methods for separation of gangue or matrix from metallic compounds.

iv) To know the terms smelting, flux.

References:

i) Advanced Inorganic Chemistry, Satyaprakash, Tuli, Basu, pages 262-271.

ii) Text book of Inorganic Chemistry, P.L. Soni, pages 2.3-2.8, 2.13-2.17.

Chapter 4: Metallurgy of Aluminium (Electrometallurgy): [4]

Occurrence, Physiochemical principles, Extraction of Aluminium, Purification of bauxite by Baeyer's process, Electrolysis of alumina, application of aluminum and its alloys.

Aims: To study metallurgy of Aluminium.

Objectives: A student should be able -

i) To know physico-chemical principles involved in electrometallurgy.

ii) To understand electrolysis of alumina and its refining.

iii) To explain the uses of Aluminum and its alloys.

iv) To know purification of bauxite ore.

References:

i) Advanced Inorganic Chemistry, Satyaprakash, Tuli, Basu pages 458-463.

ii) Text book of Inorganic Chemistry, P.L. Soni pages 2.209 to 2.211

Chapter 5: Metallurgy of Iron and Steel (Pyrometallurgy) [8]

Occurrence, concentration, calcination, smelting physio-chemical principles, reactions in the blast furnace, wrought iron, manufacture of steel by Bessemer and L.D. process, its composition and applications.

Aims: To study metallurgy of Iron.

Objectives: A student should be able -

i) To explain the term pyrometallurgy and to explain the physico chemical principles involved in the reduction process by carbon monoxide.

ii) To know different reactions in the blast furnace.

iii) To differentiate between properties of pig iron and wrought iron.

iv) To explain the basic principles of different methods for preparation of steel.

v) To explain the merits and demerits of different methods.

Reference:

i) Advanced Inorganic Chemistry, Satyaprakash, Tuli, Basu pages 830-849.

Chapter 6: Corrosion and Passivity: [6]

(a) Corrosion : Definition of corrosion, Types of corrosion, Atmospheric, Immersed, Mechanism of electrochemical corrosion, Factors affecting corrosion - position of metal in E. C. S., purity effect of moisture, effect of oxygen, pH, physical state of metal, methods of protection of metal from corrosion- alloy formation, making metal cathodic, controlling

external condition. Coating-galvanising, Tinning, electroplating, metal cladding, organic coating.

(b) Passivity : Definition, Theories of passivity - (i) Oxide film theory (ii) Gaseous film theory (iii) Physical film theory, Valence theory, Catalytic theory, Allotropic theory, Electrochemical passivity.

A student should know -

i) Definition of corrosion.

ii) Types of corrosion.

iii) Mechanism of corrosion.

iv) Factors affecting corrosion.

v) Methods of prevention of metal from corrosion.

vi) Meaning of passivity.

vii) Different theories of passivity.

viii) Galvanising, Tinning, Electroplating from corrosion.

Reference:

i) Introduction to Electrochemistry by S. Glasstone, 2nd Ed. pages 491-503.

SEMESTER – II

Paper 3: CH-221

Section – I

Physical Chemistry

Chapter 1: Free Energy and Equilibrium **[12]**

Introduction, Helmholtz free energy, variation of Helmholtz free energy with volume and temperature, Helmholtz free change energy for chemical reaction,Gibb's free energy, Variation of Gibb's free energy with pressure and temperature, Gibb's free energy change for chemical reaction, Free energy change for physical transitions, Free energy change for an ideal gas; standard free energy change, Gibb's-Helmholtz equation, Properties and significance of Gibb's free change, Van't Hoff reaction isotherm, thermodynamic equilibrium constants, Relation between Kp and Kc for gaseous reactions, variation of equilibrium constant with temperature, Criteria for chemical equilibrium, Physical equilibrium, Clapeyron equation, Clausius–Clapeyron equation, Application of Clausius–Clapeyron equation, numericals.

Aim: To conceptualize phenomenon of free energy and equilibria.

Objectives: The student should able to know

i. Free energy concepts, types and its variation
ii. Free energy change for chemical reaction and physical transition
iii. Free energy change for ideal gases
iv. Gibb's Helmholtz equations and its properties & significance
v. van't Hoff reaction isotherm and thermodynamic equilibrium constants,
vi. Chemical and physical equilibrium
vii. Clausius –Clapeyron equation and its applications
vii. To solve numericals.

Ref. 1: Page no. 189 to 200, 206

Ref. 2: Relevant pages.

Chapter 2: Solutions of Liquids in Liquids **[12]**

Types of solutions, Ideal solutions, Raoult's law, ideal and non ideal solutions, Henry's law, Application of Henry's law with example CS_2 in acetone, problems based on Raoult's law and Henry's law, vapor pressure–composition diagram of ideal and non ideal solution, temperature composition diagram of miscible binary solutions, distillation from temperature–composition diagram, Azeotropes, Partially immiscible liquids.

Aim: To distinguish behavior of liquid phase solutions.

Objectives: The student should to know

i. Ideal and non ideal solutions and laws governing these solutions
ii. Interpretation of vapor pressure–composition diagram
iii. Interpretation of temperature composition diagram.
iv. Distillation from temperature – composition diagram,
v. Azeotropes
vi. Partially immiscible liquids.
vii. To solve numericals

Ref.2: Pages 229 to 247, 254 to 258

Reference books:

1. Principles of Physical Chemistry by S.H. Maron & C. Prutton 4th edition.
2. Physical Chemistry by W.J. Moore 5th edition.
3. Physical Chemistry by P.W. Atkin 4th edition
4. Physical Chemistry by D. Alberty 3rd edition.

Section – II

Analytical Chemistry

Chapter 3: Introduction to volumetric analysis [6]

Introduction, methods of expressing concentrations, primary and secondary standard solutions. Apparatus used and their calibration: burettes, microburettes, volumetric pipettes, graduated pipettes, volumetric flask, methods of calibration, Instrumental & non-instrumental analysis – principles & types.

Aim: To provide basic knowledge essential for volumetric analysis

Objectives: A student should be able to know

i. Meaning of equivalent weight, molecular weight, normality, molality, primary and secondary standards.
ii. Different way to express concentrations of the solution.
iii. Preparation of standard solution.
iv. To solve numerical problems.
v. Calibrate various apparatus such as burette, pipette, volumetric flask, barrel pipette etc.
vi. Types instrumental and non instrumental analysis

Chapter 4: Non Instrumental volumetric analysis [18]

Indicators–theory of indicators, acid base indicators, mixed and universal indicators [3]

Acid–Base titrations: Strong acid–Strong base, Weak acid–strong base, Weak acid-Weak base titration, Displacement titrations, polybasic acid titrations. (Discuss titration with respect to neutralization and equivalence point determination and limitations) [6]

Redox titrations: Principle of redox titration, detection of equivalence point using suitable indicators. [3]

Complexometric titrations: Principle, EDTA titrations, choice of indicators [6]

Iodometry and Iodimetry: Principle, detection of end point, difference between iodometry and iodimetry, Standardization of sodium thiosulphate solution using potassium dichromate and iodine method, Applications – estimation of Cu , estimation of Cl_2.

Aim: To learn and equip with non instrumental volumetric techniques

Objectives: The student should able to

i. Explain role of indicators.
ii. Know mixed and universal indicators.
iii. Know neutralization curves for various acid base titration
iv. Know principle of complexometric precipitation and redox titrations.
v. Know the definitions and difference between iodometry and iodimetry.
vi. To know standardization of sodium thiosulphate and EDTA.
vii. Reactions between $CuSO_4$ and Iodine and liberated I_2 and $Na_2S_2O_3$
viii. Choice of suitable indicator.
ix. Estimate copper from $CuSO_4$ and available chlorine in bleaching powder.
x. Prepare standard silver nitrate solution.
xi. Mohr’s and Fajan’s method.
xii. Determine the amount of halides separately and in presence of each other.

Paper 4: CH-222

Section – I

Organic Chemistry

Chapter 1: Reagents in Organic Synthesis [8]

Catalytic hydrogenation including liquid phase hydrogenation, Birch reduction, $NaBH_4$, $LiAlH_4$, Sn/HCl

Oxidation reagents: $KMnO_4$, $K_2Cr_2O_7$, Jones reagent, PCC, Per acids, OsO_4.

Student should understand:

i) Concept of different reagents used in the one type of conversion

ii) Merits & demerits of different reagents

iii) Reagent based mechanisms

iv) Use of different hydrogen donors for hydrogenation

Ref. 1 & 4

Chapter 2: Chemistry of heterocyclic compounds with one hetero atom. [6]

Definition and classification of heterocyclic compounds, nomenclature and aromatic character. Synthesis of Pyrrole, Furan, Thiophene, Pyridine and their reactions: Nitration, Sulphonation, Acylation and Catalytical reduction. Structure and synthesis of quinoline and Isoquinoline.

Student should know:

i) Define and classify heterocyclic compounds.

ii) Use Huckel rule to predict aromaticity.

iii) Suggest synthetic route for preparation of various heterocyclic compounds.

iv) Write and complete various reactions of heterocyclic compounds.

v) Predict products.

Ref. 1

Chapter 3: Introduction of Bio-molecules [10]

Carbohydrates: Definition, classification, reaction of monosaccharide (glucose)- oxidation, reduction, osazone and ester formation, isomerization, Killiani-Fischer synthesis and Ruff

degradation, Configuration of D/L configuration of (+) Glucose, Fischer-Haworth and chair formulae, Brief account of disaccharides: Sucrose, cellobiose, maltose and lactose.

Polysaccharides: Starch, cellulose and glycogen.

Amino acids: Fischer projection, relative configuration, classification, structures and reactions of amino acids, Properties and chemical reactions with amino and carboxylic group.

Proteins: Formation of Peptide linkage, α-helical conformation, β-plated structure, primary, secondary, tertiary and quaternary structure of proteins.

Ref. 2 & 3

Student should know

i) Know different biomolecules.

ii) Appreciate the role of biochemistry in the day to day life.

iii) Understand the importance of biochemistry.

iv) Define carbohydrates.

v) Classify carbohydrates giving suitable examples.

vi) Write and complete various reactions of glucose.

vii) Explain optical activity in carbohydrates.

viii) Write Fischer projection and perspective formula with glyceraldehydes as reference compound.

ix) Explain the principle in Killani Fischer synthesis.

x) Explain stereoisomerism in monosaccharide.

xi) Draw structure of some common aldoses and ketoses.

xii) Distinguish between diastereomers and epimers.

xiii) Write cyclic structure of glucose in Fischer, Haworth and chair form.

xiv) Know the phenomenon of mutaroatation.

xv) Draw the structure and bonding in maltose, lactose, cellobiose and sucrose.

xvi) Know about polysaccharide, structures of starch and cellulose.

xvii) Classify the naturally occurring amino acids.

xviii) Explains the amphoteric nature of amino acids.

xix) Know the important reactions of α-amino acids.

xx) Outline the formation of peptide bond.

xxi) Explain the hydrogen bonding in α-helical structure.

xxii) Relate the stability of α-helical chain and their R-groups.

xxiii) Define primary, secondary, tertiary and quaternary structure of proteins.

xxiv) Classify proteins.

Reference Books:

Ref. 1: Organic Chemistry-6h Ed. Morrison and Boyd Prentice Hall of India Prt Ltd, New Delhi-2001.

Ref. 2: Outline of Biochemistry 5h Ed., Conn, Stumpf Bruening and Roy Doi John Wiley 1987.

Ref. 3: Stereochemistry of carbon compounds - E. L. Eliel

Ref. 4: Reactions, rearrangements and reagents – S N Sanyal

Section – II

Inorganic Chemistry

Chapter 4: Chemistry of d-block elements [6]

Position of d-block in periodic table, electronic configuration, trends in properties of these elements w.r.t.(a) size of atoms & ions (b) reactivity (c) catalytic activity (d) oxidation state (e) complex formation ability (f) colour (g) magnetic properties (h) non-stoichiometry (i) density, melting & boiling points.

Student should know:

i) To know position of d-block elements in periodic table.

ii) To know the general electronic configuration & electronic configuration of elements.

iii) To know trends in periodic properties of these elements w.r.t. size of atom and ions, reactivity, catalytic activity, oxidation state, complex formation ablility, colour, magnetic properties, non-stoichiometry, density, melting point, boiling point.

Chapter 5: Organometallic Chemistry [6]

Definition of Organometallic compounds and Organometallic chemistry, CO as a π-acid donor ligand, binary metal carbonyls, methods of synthesis; (a) Direct reaction (b) Reductive carbonylation (c) Photolysis and thermolysis. Molecular and electronic structures (18 electron rule) of metal carbonyls. Homogenous catalysis-Hydroformylation (Oxo Process) and Wacker Process.

Aim: To study the metal carbonyl complexes and their uses in the homogenous catalysis.

Objectives:

Students should be able:

i) To understand M-C bond and to define organometallic compounds

ii) To define organometallic chemistry

iii) To understand the multiple bonding due to CO ligand.

iv) To know methods of synthesis of binary metal carbonyls.

v) To understand the structure and bonding using valence electron count (18 electron rule)

vi) To understand the catalytic properties of binary metal carbonyls.

vii) To understand the uses of organometallic compounds in the homogenous catalysis.

References:

1. Concise Inorganic Chemistry by J. D. Lee-relevant pages.

2. General Chemistry-Raymond Chang- relevant pages.

Chapter 6: Acids, Bases and Solvents [6]

Definition of acids and bases, Arrhenius theory, Lowry-Bronsted theory, Lewis concept, Lux-Flood theory, strength of acids and bases, trends in the strength of hydracids and oxyacids, Properties of solvents, M.P-B.P range, dipole moment, dielectric constant, Lewis acid-base character and types of solvents.

Ref: Basic Inorganic Chemistry – F. A. Cotton (Pages- 163-173)

(6) Acids, Bases, Solvents and reactions in non-aqueous solvents:

Aims: To study different solvents and to know the different theories of acids and bases.

Objectives: A student should be able -

i) To define acids and bases according to Arrhenius theory Lowery- Bronsted concept, Lewis concept.

ii) To explain the merits and demerits of different theories of acids and bases.

iii) To define the conjugate acid and base pairs.

iv) To explain the leveling effect of solvents.

v) To demonstrate the trends in the strength of hydracids, oxyacids.

vi) To define hard and soft acids.

vii) To know the trends in the strength of hydra and oxyacids.

viii) To know the rules governing the strength of oxyacids.

ix) To explain the properties of a solvent that determines their utility.

x) To know some useful solvents.

xi) To explain the reactions in non-aqueous solvents like HF and NH3.

Chapter 7: Chemical Toxicology [6]

Toxic chemicals in the environment, Impact of toxic chemistry on enzymes.

Biochemical effect of Arsenic, Cadmium, Lead, Mercury, Biological methylation.

A student should be able -

i) To know toxic chemical in the environment.

ii) To know the impact of toxic chemicals on enzyme.

iii) To know the biochemical effect of Arsenic, Cd, Pb, Hg.

iv) To explain biological methylation.

Reference:

i) Fundamental Chemistry by A. K. Dee. (3^{rd} Ed.)

Practical Course in Chemistry CH – 223

A) Physical Chemistry practicals (Any Five)

i. To determine critical solution temperature of phenol water system

ii. To determine molecular weight of given organic liquid by steam distillation

iii. Determination of solubility of benzoic acid at different temperature and to determine ΔH of dissociation process.

iv. To study neutralization of acid (HCl) base (NaOH) and CH_3COOH by NaOH and H_2SO_4 by NaOH.

v. To determine the rate constant (or to study kinetics) of acid catalyzed ester hydrolysis.

vi. To determine the rate constant of base catalyzed ester hydrolysis.

vii. Partition coefficient of iodine between water and carbon tetrachloride.

Aim: To equip students to correlate theoretical and experimental knowledge

Objectives: After completion of practical course student should be able to

i. Verify theoretical principles experimentally

ii. Interpret the experimental data

iii. Improve analytical skills

iv. Correlate the theory and experiments and understand their importance

B) Inorganic Qualitative Analysis (Minimum Five mixtures)

i. One simple mixture (without phosphate or borate)

ii. Two Mixtures containing PO_4^{3-} (With PO_4^{3-} removal)

iii. Two Mixtures containing BO_3^{3-} (With BO_3^{3-} removal)

Inorganic Qualitative Analysis of Binary Mixtures (including phosphate and borate removal).

Sodium carbonate extract is to be used wherever necessary for detecting acidic radicals.

C) Organic Chemistry Practical

a. Organic qualitative analysis of Binary Mixtures without ether separation (**Four only**)

Two: solid-solid, one: solid-liquid, one: liquid-liquid

b. Organic Preparation: (**Any two including Crystallization, MP, TLC**)

i) Pthalic anhydride to pthalamide

ii) Glucose to osazone

iii) Acetanilide to p-bromoactanilide

iv) Benzaldehyde to dibenzylidene acetone

After completion of practical course student should be able to –

i) Verify theoretical principles experimentally.

ii) Acquire skill of crystallisation, record correct m. p. / b. p.

iii) Perform the complete chemical analysis of the given organic compound and should be able to recognize the type of compound.

iv) Write balanced equation for all the reactions, they carry in the laboratory.

v) Perform the given organic preparation according to the given procedure.

vi) Follow the progress of the reaction by using TLC technique.

vii) Set up the apparatus properly for the given experiments.

viii) Perform all the activities in the laboratory with neatness and cleanness.

Ref. 1 Organic Qualitative Analysis: A. I. Vogel

D) Analytical Chemistry Practicals (Any Five)

i. Estimation of sodium carbonate content of washing soda.
(Vogel 5thEdition: 10.30 page 295).

ii. Determination of Ca in presence of Mg using EDTA.
Ref.2: Page 412

iii. a) Preparation of standard 0.05 N oxalic acid solution and standardization of approx. 0.05N $KMnO_4$ solution.
b) Determination of the strength of given H_2O_2 solution with standard 0.05 N $KMnO_4$solution.

iv. Estimation of Aspirin from a given tablet and find errors in quantitative analysis.

v. Estimation of Al (III) from the given aluminium salt solution by using Erichrome Black–T indicator (Back titration method)

vi. Iodometric estimation of copper.

vii. Report on one day industrial educational visit.

Reference books

1. Analytical Chemistry by G.D. Christian 6th edition.
2. Vogel's Textbook of Quantitative chemical analysis 6th edition R.C. Denney, J.D. Barnes, M.J.K. Thomas

Aim: To equip students to correlate theoretical and experimental knowledge

Objectives: After completion of practical course student should be able to

i. Verify theoretical principles experimentally

ii. Interpret the experimental data

iii. Improve analytical skills

iv. Correlate the theory and experiments and understand their importance

N.B. - Industrial visit during the academic year is compulsory.

Savitribai Phule Pune University, Pune
T.Y.B.Sc. Chemistry Syllabus

To be implemented from June 2015
(Academic Year 2015-16)
Preamble of the Course

1. T.Y.B.Sc. Chemistry is consisting of six theory and three practical courses.
2. Each theory course is of 48 lectures; 4 lectures per course per week should be conducted in every semester.

3. Out of five optional courses recommended for CH-336 and CH-346, only one option should be taught and the same course should be implemented for the next semester.

4. Each practical course is of 4 lectures per week per batch. Practical batch for each course should comprise of 12 students only.

5. Each theory paper will carry 50 Marks out of which 10 Marks will be allotted for Internal assessment and University Examination will be conducted for 40 Marks at the end of each semester.

6. The practical examination of six hours for each practical course will be conducted at the end of Semester-IV. Each practical course will carry 100 Marks out of which 20 Marks will be allotted for Internal assessment and University Examination will be conducted for 80 Marks.

7. **Marks for internal assessment of Practical courses will be allotted as follows.**
   a. Completed and Certified journal and regularity of the student 10 Marks
   b. Oral Examination and Internal Test 10 Marks

8. Internal assessment for theory courses will be done on the basis of the performance of the student in tests. Minimum two tests should be arranged for each course in a Semester.

9. Visit to a chemical industry may be organized during the academic year.

Savitribai Phule Pune University

Board of Studies in Chemistry

T.Y.B.Sc. Chemistry Syllabus

Structure to be implemented from June 2015 (i.e. from Academic Year 2015-16)

Semester	Course Code and Title	Number of Lectures	Marks
Semester III	CH-331: Physical Chemistry	48	50
	CH-332: Inorganic Chemistry	48	50
	CH-333: Organic Chemistry	48	50
	CH-334: Analytical Chemistry	48	50
	CH-335: Industrial Chemistry	48	50
	OPTIONAL COURSE CH-336-A Nuclear Chemistry**OR** CH-336-B Polymer Chemistry**OR** CH-336-C Introduction to Biochemistry and Molecular Biology **OR** CH-336-D Environmental and Green Chemistry**OR** CH-336-E Agriculture Chemistry	48	50
Semester IV	CH-341: Physical Chemistry	48	50
	CH-342: Inorganic Chemistry	48	50
	CH-343: Organic Chemistry	48	50
	CH-344: Analytical Chemistry	48	50
	CH-345: Industrial Chemistry	48	50
	OPTIONAL COURSE CH-346-A Nuclear Chemistry**OR** CH-346-B Polymer Chemistry**OR** CH-346-C Introduction to Biochemistry and Molecular Biology **OR** CH-346-D Environmental and Green Chemistry**OR** CH-346-E Dairy Chemistry	48	50
	PRACTICAL COURSES		
	CH-347: Physical Chemistry Practicals		100
	CH-348: Inorganic Chemistry Practicals		100
	CH-349: Organic Chemistry Practicals		100

NOTE

1. Each theory paper will carry 50 Marks out of which 10 Marks will be allotted forinternal assessment and University Examination will be conducted for 40 Marks atthe end of each semester.

2. The practical examination will be conducted at the end of Semester-IV. Each practicalcourse will carry 100 Marks out of which 20 Marks will be allotted for internalassessment and University Examination will be conducted for 80 Marks.

3. Marks for internal assessment of Practical courses will be allotted as follows.

a. Completed and certified journal 10 Marks

b. Overall performance and regularity of the student during whole academic year 10 Marks

4. Internal assessment for theory courses will be done on the basis of the performance ofthe student in tests. Minimum two tests should be arranged for each course in aSemester.

Date: 29/04/2015

Dr. B. R. Khot
Chairman,
BOS in Chemistry

Savitribai Phule Pune University

Board of Studies in Chemistry

T.Y.B.Sc. Chemistry Syllabus

To be implemented from June 2015 (i.e. from Academic Year 2015-16)

Equivalenceof the Courses

Semester	Course Code and Title (Old)	Course Code and Title (New)
Semester III	CH-331: Physical Chemistry	CH-331: Physical Chemistry
	CH-332: Inorganic Chemistry	CH-332: Inorganic Chemistry
	CH-333: Organic Chemistry	CH-333: Organic Chemistry
	CH-334: Analytical Chemistry	CH-334: Analytical Chemistry
	CH-335: Industrial Chemistry	CH-335: Industrial Chemistry
	OPTIONAL COURSE CH-336-A Nuclear Chemistry CH-336-B Polymer Chemistry CH-336-C Introduction to Biochemistry and Molecular Biology CH-336-D Environmental Chemistry CH-336-E Agriculture Chemistry	**OPTIONAL COURSE** CH-336-A Nuclear Chemistry CH-336-B Polymer Chemistry CH-336-C Introduction to Biochemistry and Molecular Biology CH-336-D Environmental and Green Chemistry CH-336-E Agriculture Chemistry
Semester IV	CH-341: Physical Chemistry	CH-341: Physical Chemistry
	CH-342: Inorganic Chemistry	CH-342: Inorganic Chemistry
	CH-343: Organic Chemistry	CH-343: Organic Chemistry
	CH-344: Analytical Chemistry	CH-344: Analytical Chemistry
	CH-345: Industrial Chemistry	CH-345: Industrial Chemistry
	OPTIONAL COURSE CH-346-A Nuclear Chemistry CH-346-B Polymer Chemistry CH-346-C Introduction to Biochemistry and Molecular Biology CH-346-D Environmental Chemistry CH-346-E Dairy Chemistry	**OPTIONAL COURSE** CH-346-A Nuclear Chemistry CH-346-B Polymer Chemistry CH-346-C Introduction to Biochemistry and Molecular Biology CH-346-D Environmental and Green Chemistry CH-346-E Dairy Chemistry
	PRACTICAL COURSES	**PRACTICAL COURSES**
	CH-347: Physical Chemistry Practicals	CH-347: Physical Chemistry Practicals
	CH-348: Inorganic Chemistry Practicals	CH-348: Inorganic Chemistry Practicals
	CH-349: Organic Chemistry Practicals	CH-349: Organic Chemistry Practicals

Date: 29/04/2015

Dr. B. R. Khot
Chairman,BOS in Chemistry

Semester-III
Course: Physical Chemistry (CH-331)

Topic	No. of Lectures
1. Chemical Kinetics	10
2. Electrolytic Conductance	14
3. Investigation of Molecular Structure	16
4. Phase Rule	08
Total Lectures	**48**

1. Chemical Kinetics : **[10 L]**

Recapitulation of Chemical Kinetics, Third order reaction, Derivation of integrated rate law for third order reaction with equal initial concentration, characteristics of third order reaction, examples of third order reaction, Methods to determine order of reaction using Integrated rate equation method, Graphical method, Half-life method, Differential method. Effect of temperature on reaction rate, Arrhenius equation, related numerical.

[Ref. 1 : Pages 567-574, Ref. 2: Pages 600-612]

2. Electrolytic Conductance: **[14 L]**

Recapitulation of Electrolytic conductance,Specific and equivalent conductance,Variation of equivalent conductance with concentration,

Kohlrausch's law and its applications to determine

a. Equivalent conductance at infinite dilution of a weak electrolyte,
b. The ionic product of water,
c. Solubility of sparingly soluble salts,

Migration of ions and ionic mobilities, absolute velocity of ions, Transport number determination by Hittorf's method and moving boundary method, Relation between ionic mobility, ionic conductance and transport number, Ionic theory of conductance, Debye-Huckel –Onsager equation and its validity, Activity in solution, fugacity and activity coefficient of strong electrolyte.

[Ref. 1 : Pages 398-437, Ref. 2 : Pages 686-703]

3. Investigations of Molecular Structure: **[16 L]**

Molar refraction, Electrical polarization of molecules, Permanent dipole moment, Determination of dipole moment, Molecular spectra - Rotational, vibrational and Raman spectra Reference

[Ref. 1 : pages 691-710 Ref. 2 : Pages 398-424]

4. Phase Rule: **[08 L]**

Definitions, Gibb's phase rule, one component system (moderate pressure only) for sulphur and water system, two component system for silver-lead and zinc-cadmium.

[Ref. 1 : Pages 344-350, 350-354; Ref. 2 Pages 558-575]

AIMS AND OBJECTIVES:

1. **Chemical Kinetics :** After studying this topic students are expected to know-
   i. Expression for rate constant k for third order reaction
   ii. Examples of third order reaction
   iii. Characteristics of third order rate constant k
   iv. Derivation for half-life period of third order reaction and to show that half-life is inversely proportional to square of initial concentration of reactants.
   v. Experimental determination of order of reaction by Integrated rate equation method, Graphical method, Half-life method and Differential method.
   vi. Explain the term energy of activation with the help of energy diagram
   vii. Explain the term temperature coefficient.
   viii. Effect of temperature on rate constant k
   ix. Derivation of Arrhenius equation
   x. Graphical evaluation of energy of activation
   xi. Solve the numerical problems based on this topic.

2. **Electrolytic Conductance :** After studying this topic students are expected to know-
   i. Ohm's law and electrical units such as coulomb, Ampere, Ohm and Volt.
   ii. Meaning of specific resistance, specific conductance, cell constant and their units.
   iii. Cell constant, its theoretical and experimental determination.
   iv. Preparation of conductivity water.
   v. Experimental determination of conductance.
   vi. Variation of specific and equivalent conductance of strong and weak electrolyte with dilution
   vii. Meaning of infinitely dilute solution.
   viii. Kohlrausch's law of independent migration of ions and its applications such equivalent conductance of weak electrolyte at zero conc., degree of dissociation (α),ionic product of water.
   ix. Transport number of an ion
   x. Hittorf's rule
   xi. Experimental determination of transport number by Hittorf's and moving boundary method.
   xii. Drawbacks of Arrhenius theory, Debye-Huckel-Onsager Interionic Attraction theory
   xiii. Asymmetry /Relaxation effect
   xiv. Electrophoretic effect
   xv. Validity of Onsager equation
   xvi. Fugacity and activity concept
   xvii. Activity and activity coefficient of strong electrolyte.
   xviii. Solve the numerical problems based on this topic.
   xix.
3. **Investigation of molecular structure :** After studying this topic students are expected to know-
   i. Understand the term additive and constitutive properties
   ii. Understand the term specific volume, molar volume and molar refraction.
   iii. Understand the meaning of electrical polarization of molecule.

iv. Understand the meaning of induced and orientation polarization
v. Dipole moment and its experimental determination by temperature variation method.
vi. Application of dipole moment for structure determination.
vii. Nature of wave and its characteristics such as wavelength, wave number, frequency and velocity.
viii. Rotational / Microwave spectroscopy
ix. Derivation for rotational spectra for the transition from J to J+1
x. Limitations of Rotational Spectra.
xi. Vibrational Spectra
xii. Vibrational rotational Spectra
xiii. Raman Spectroscopy
xiv. Solve the numerical problems based on this topic.

4. **Phase Rule :** After studying this topic students are expected to know-
   i. Meaning and Types of equilibrium such as true or static, metastable and Unstable equilibrium.
   ii. Meaning of phase, component and degree of freedom.
   iii. Derivation of phase rule.
   iv. Explanation of water system : Description of the curve, Phase rule relationship and typical features.
   v. Explanation of sulphur system : Description of the curve, Phase rule relationship and typical features.
   vi. Explanation of two component system curve : for silver-lead and Zinc-cadmium.

References:

1. Principles of Physical Chemistry, Fourth Edition by S.H. Marron and C. F. Pruton

2. Essentials of Physical Chemistry by B.S. Bahl, G.D.Tuli and ArunBahl Edition 2000 S. Chand and Company Ltd.

2. Essentials of Physical chemistry by BahlTuli-Revised Multicolor Edition 2009

3. Essentials of Nuclear Chemistry, H.J.Arnikar Second edition

4. Nuclear and Radiation Chemistry, Third edition

5. Quantum Chemistry second edition by Manas Chandra

6. Physical Chemistry a molecular approach by Donald A. McQuarrie , John D. Simon

Semester-IV
Course: Physical Chemistry (CH-341)

Topic	No. of Lectures
1. Electrochemical Cells	14
2. Nuclear Chemistry	12
3. Crystal Structure	12
4. Quantum Chemistry	10
Total Lectures	**48**

1. Electrochemical Cells [14 L]

Reversible and irreversible cells,EMF and its measurements,Standard cells, cell reaction and EMF,Single electrode potential and its calculation,Calculation of cellEMF,Thermodynamics of cell EMF,Types of electrodes,Classification of electrochemical cells with and without transference,Applications of EMFmeasurement-i)Solubility product of sparingly soluble salt,ii)Determination of pH,iii)Potentiometric titration

[Ref. 1 : Pages: 471-486, 492-519]

2. Nuclear Chemistry [12 L]

The atom, nucleus and outer sphere, classification of nuclides, nuclear stability and binding energy.Discovery of radioactivity, types of radioactivity, general characteristics of radioactive decay and decay kinetics,Measurements radioactivity, gaseous ion collection method, proportional and G.M. counter.

Applications of radioactivity-

Radiochemical principles in the use of tracers,

Typical applications of radioisotopes as a tracer-

i) Chemical investigations- reaction mechanism,

ii)Structure determination- phosphorus pentachloride and thiosulphate ion

iii)Age determination- by Carbon-14 dating and Uranium-Lead/ Thorium-Lead Ratio

iv) Medical applications-Assess the volume of blood in patients body, Goiter

[Ref. 3 : Pages 1, 4-15, 117-119,121-125,371-378,Ref. 4:.Pages 243-245,247-251]

3. Crystal structure [12 L]

Crystallization and fusion process,Crystallography, Crystal systems,-Properties of crystals, Crystal lattice and unit cell,-Crystal structure analysis by X ray - The Laue method and Braggs method,

- X-ray analysis of NaCl crystal system,
- Calculation of d and λ for a crystal system.

[Ref. 1 : Pages 67-85]

4. Quantum Chemistry **[10 L]**

Concept of quantization, atomic spectra (no derivation), wave particle duality, uncertainty principle, wavefunction and its interpretation, well-behaved function, Hamiltonian (energy) operator, formulation of Schrodinger equation, particle in box (1D, 2D and 3D box) (no derivations), sketching of wavefunction and probability densities for 1D box, correspondence principle, degeneracy(lifting of degeneracy), applications to conjugated systems, harmonic oscillator, wavefunction and probability densities (no derivation), zero point energy and quantum tunneling.

[Ref. 5.Quantum Chemistry second edition by Manas Chandra- Relevant pages
Ref. 6.Physical Chemistry a molecular approach by Donald A. Mc.Quarrie, John D. Simon- Relevant pages]

AIMS AND OBJECTIVES:

1. ElectrochemicalCell : After studying this topic students are expected to know-

i. What is mean by Electrochemical cell with specific example
ii. Origin of EMF of electrochemical cell.
iii. Conventions used to represent electrochemical cell.
iv. Thermodynamic conditions of reversible cell
v. Explanations of reversible and irreversible electrochemical cell with suitable example.
vi. What is mean by reference electrode?
vii. Primary and secondary reference electrode
viii. Construction, representation, working and limitation of Standard hydrogen Electrode
ix. Construction, representation and working of Calomel and Silver –Silver Chloride electrode
x. Types of electrodes
xi. Conditions of Standard Cell
xii. Construction, representation and working of Weston Standard Cell.
xiii. Measurement of EMF of electrochemical cell
xiv. Nernst Equation for theoretical determination of EMF.
xv. Thermodynamics and EMF: Relation of EMF with ΔG, ΔG°,ΔH, ΔS and equilibrium constant K of the cell reaction.
xvi. Explanation of the term liquid junction potential
xvii. Classification of electrochemical cell
xviii. Chemical cell with and without transfer
xix. Electrode and electrolytic concentration cell
xx. Concentration cell with and without transfer.
xxi. Application of EMF measurement such as pH determination, Determination of solubility and solubility product.
xxii. Potentiometric titrations: Weak acid against strong base, Titration of polybasic acids, Precipitation and Redox titrations.
xxiii. Solve the numerical problems based on this topic.

2. Nuclear Chemistry: After studying this topic students are expected to know-

i. The atom its nucleus and outer sphere.
ii. Classification of nuclides with suitable examples such as isotope, isobar, isotone and isomers
iii. Explanation of stability of nucleus through neutron to proton ratio, odd and even nature of proton and neutron, Mean binding energy.
iv. Conversion of mass into energy
v. Mass defect, Total and mean binding energy
vi. Explanation of binding energy curve.
vii. Types of decay
viii. Discovery of radioactivity
ix. Decay kinetics
x. Relation of half-life with decay constant.
xi. Unit of Radioactivity : Curie Bq
xii. Measurement of radioactivity by G.M. and proportional counter
xiii. Principle, construction and working of G.M. / Proportional counter.
xiv. Application of radioisotopes as a tracer
xv. Chemical investigation : Reaction mechanism and structure determination w.r.t PCl_5 and thiosulphate ion
xvi. Age determination- by Carbon-14 dating and Uranium-Lead/ Thorium-Lead Ratio
xvii. Medical applications-Assess the volume of blood in patients body, Goitre
xviii. Solve the numerical problems based on this topic.

3. Crystal Structure: After studying this topic students are expected to know-

i. Distinguish between crystalline and amorphous solids / anisotropic and isotropic solid
ii. Explain the term crystallography and laws of crystallography
iii. Weiss and Millers Indices
iv. Crystal system and their characteristics
v. Explain the term polymorphism /allotrophism
vi. Distance between the planes for 100, 110 and 111 type of simple, body centred and face centred cubic crystals
vii. Bragg's experiment and Derivation of ($n\lambda = 2d\sin\theta$)Bragg's equation
viii. Explanation: Structure of NaCl can be ascertained with the help of X-ray analysis.
ix. Laue's and Bragg's method.

4.Quantum Chemistry: After studying this topic students are expected to know-

i. Concept of quantization
ii. Atomic spectra
iii. Wave particle duality
iv. Uncertainty principle and its physical significance
v. Derivation of time independent Schrodinger wave equation.
vi. Wave function and its Interpretation
vii. Well behaved function
viii. Hamiltonian Operator
ix. Particle in a box (1 and 3 dimensional)
x. Degeneracy

xi. Application to conjugated systems
xii. Harmonic oscillator
xiii. Solve the numerical problems based on this topic.

References:

1.Principles of Physical Chemistry, Fourth Edition by S.H. Marron and C. F. Pruton

2. Essentials of Physical Chemistry by B.S. Bahl, G.D.Tuli and ArunBahl Edition 2000 S. Chand and Company Ltd.

2. Essentials of Physical chemistry by BahlTuli-Revised Multicolor Edition 2009

3.Essentials of Nuclear Chemistry, H.J.Arnikar Second edition

4.Nuclear and Radiation Chemistry, Third edition

5.Quantum Chemistry second editionby Manas Chandra

6.Physical Chemistry a molecular approachby Donald A. McQuarrie , John D. Simon

Physical Chemistry Practicals:CH- 347

Group A:

1. Chemical Kinetics: (Any Five):

1.To study the effect of concentration of the reactants on the rate of hydrolysis of an ester.

2.To compare the relative strength of HCl and H_2SO_4 by studying the kinetics of hydrolysis of an ester.

3.To compare the relative strength of HCl and H_2SO_4 by studying the kinetics of Inversion of cane sugar using Polarimeter.

4.To study the kinetics of iodination of acetone

5.To determine the first order velocity constant of the decomposition of hydrogen peroxide by volume determination of oxygen.

6.To determine the energy of activation of the reaction between potassium iodide and potassium persulphate.

7.To determine the order of reaction between $K_2S_2O_8$ and KI by half-life method.

2. Viscosity:

To determine the molecular weight of a high polymer by using solutions of different concentrations.

3.Adsorption

To investigate the adsorption of oxalic acid /acetic acid by activated charcoal and test the validity of Freundlich / Langmuir isotherm

4. Phenol-water system

To study the effect of addition of salt on critical solution temperature of phenol water System

5. Transport number

To determine the transport number of cation by moving boundary method.

6. Refractometry (any two)

i)To determine the specific refractivity's of the given liquids A and B and their mixture and hence determine the percentage composition their mixture C.

ii) To determine the molecular refractivity of the given liquids A, B, C and D.

iii)To determine the molar refraction of homologues methyl, ethyl and propyl alcoholand show the constancy contribution to the molar refraction by $-CH_2$ group.

Group B

1. Colorimetry (any two)

i)Determination of λ_{max} and concentration of unknown solution of $KMnO_4$ in 2 N $H2SO_4$

ii)Determination of λ_{max} and concentration of unknown solution of $CuSO_4$.

iii)To titrate Cu^{2+} ions with EDTA photometrically.

iv)To determine the indicator constant of methyl red indicator

2. Potentiometry(any three)

i)To prepare standard 0.2 M Na_2HPO and 0.1 M Citric acid solution, hence prepare four different buffer solutions using them. Determine the pka value of these and unknown solutions.

ii)To determine the concentrations of strong acid and weak acid present in the mixture by titrating with strong base.

iii)To determine the formal redox potential of Fe^{2+}/ Fe^{3+} system potentriometrically

iv)To determine the amount of NaCl in the given solution by potentiometric titration against silver nitrate.

3.pH metry (any two)

i)To determine the degree of hydrolysis of aniline hydrochloride

ii)To determine pka value of given weak acid by pH-metric titration with strong base.

iii)To determine the dissociation constant of oxalic acid by pH-metric titration with strong base

iv)To determine pH of various mixtures of sodium acetate and acetic acid in aqueous solution and hence to find the dissociation of acetic acid.

4.Radioactivity (any one)

i)To determine plateau voltage of the given G M counter.

ii)To determine the resolving time of GM counter

iii)To determine E_{max} of beta particle

5.Conductrometry (any two)

i)To determine the cell constant of the given cell using 0.01 M KCl solution and hence determine dissociation constant of a given monobasic weak acid.

ii)To estimate the amount of lead present in given solution of lead nitrate by conductometric titration with sodium sulphate.

iii)To investigate the conductometric titration of any one of the following

a)Strong acid against strong base

b)Strong acid against weak base

c)Strong base against weak acid

d)Weak acid against weak base

STRUCTURE OF PRACTICAL EXAMINATION

	Experiment	**Marks**
1.	One Experiment from Group – A	35
2.	One Experiment from Group-B	35
3.	Oral	10

References:

1. Practical Physical Chemistry, 3rd Edn. A. M. James and F. E. Prichard, Longman publication.
2. Experiments in Physical Chemistry, R. C. Das and B. Behra, Tata McGraw Hill.
3. Advanced Practical Physical Chemistry, J. B. Yadav, Goel Publishing House.
4. Advanced Experimental Chemistry, Vol-I, J. N. Gurtu and R. Kapoor, S. Chand and Company.
5. Physical Chemistry Experiments, Raghvan and Vishwanathan.

Semester-III

Course: Inorganic Chemistry (CH-332)

Topic	No. of Lectures
1. Molecular Orbital Theory	15
2. Coordination Chemistry	33
Total Lectures	**48**

1. Molecular Orbital Theory **15 L**

Limitations of Valence Bond theory(VBT), Need of Molecular orbital theory (MOT), Features of MOT, Formation of molecular orbitals(MO's) by LCAO principle, Rules of LCAO combination, Different types of combination of Atomic orbital(AO's): S-S, S-P, P-P and d-d, Non-bonding combination orbitals(formation of NBMO), M.O. Energy level diagram for homonuclear diatomic molecules, Bond order and existence of molecule from bond order, Energy (β) and magnetic behavior for following molecules or ions: H_2, H_2^+, He_2^+, Li_2, Be_2, B_2, C_2, N_2, O_2, O_2^+, O_2^-, O_2^{2-}, F_2, Ne_2,

M.O. energy level diagram, for heteronuclear diatomic molecule like CO, NO, HCl, HF.

M.O. energy level diagram, for heteronuclear triatomic molecule like CO_2, NO_2

Ref. 2 Pages 89-112, 106-117
Ref. 4 Pages 55-72

Aims and objective:

A student should:

i. Know the theories of covalent bond formation
ii. Know the assumptions and limitations of VBT
iii. Understand the need of concept of MOT
iv. Know LCAO principal and its approximation
v. Understand and show the formation of bonding and antibonding MO's
vi. Draw the shapes of s, p, d orbital
vii. Draw combinations of s-s, s-p, p-p and d-d orbital to form σ and π molecular orbitals.
viii. Give the comparison of
   a) Atomic orbital and molecular orbital
   b) BMO and ABMO
   c) Sigma and pi MO's
   d) VBT and MOT
   e) Comparison between BMO, ABMO and NBMO
ix. Draw the MO energy level diagrams for homonuclear diatomic molecules having interactions between 2s and 2p orbitals and having no interactions between 2s and 2p orbitals : H_2, H_2^+, He_2^+, Li_2, Be_2, B_2, C_2, N_2, O_2, O_2^+, O_2^-, O_2^{2-}, F_2, Ne_2,
x. Draw the shapes of molecular orbitals.
xi. Give the calculations of bond order, energy and explanation on stability of the above molecule and ions
xii. Draw the MO energy level diagrams for heteronuclear diatomic molecules: CO, NO, HCl, HF and calculations of bond order, energy and explain the stability of the molecules.

xiii. Understand the formation of BMO, ABMO and NBMO in CO_2 or NO_2 molecule and construct MO energy level diagrams for them.

2. Coordination Chemistry 33L

I. INTRODUCTION TO COORDINATION CHEMISTRY (03 L)

1. General account and meaning of the terms involved in coordination chemistry:
Coordinate bond, central metal atom or ions, ligand, double salt, complex compound, coordination number, charge on the complex ion, oxidation number of Metal ion, first and second coordination sphere.
2. Ligands: Definition, Classification, Chelates and chelating agents.
3. Formation Constant, inert and labile complexes.
4. IUPAC nomenclature of coordination compounds
5. Different geometries of coordination compounds with C.N.= 4 to C.N.=10 and examples of each geometry.

II. WERNER'S THEORY OF COORDINATION COMPOUNDS (02 L)

Assumptions of Werner's coordination theory, Werner's formulation of Coordination compounds, Physical and chemical test to support his formulation of ionizable and non-ionizable complexes, Stereoisomerism in complexes with C.N.4 and C.N. 6 to identify the correct geometrical arrangement of the complexes.

III. ISOMERISM IN COORDINATION COMPLEXES (04 L)

Definition of isomerism in complexes-Structural Isomerism and stereoisomerism,
1. Structural isomerism (ionization, hydrate, linkage, ligand, coordination position and polymerization isomers)
2. Stereoisomerism and its types-Geometrical isomerism and optical isomerism.

IV. SIDGWICK THEORY (02 L)

Concept of Sidgwick's model, Scheme of arrow indication for M-L bond suggested by Sidgwick, Effective Atomic Number rule (EAN), Calculations of EAN value for different complexes and stability of complexes, Advantages and Drawbacks of Sidgwick's theory.

V. PAULING'S VALENCE BOND THEORY (06 L)

Introduction of Valence Bond Theory (VBT), Need of concept of hybridization, Aspects of VBT, Assumptions, VB representation of tetrahedral, square planer, trigonalbipyramidal and octahedral complexes with examples, Inner and outer orbital complexes, Electro neutrality principle, Multiple bonding(dπ-pπ and dπ-dπ), Limitations of VBT.

VI. CRYSTAL FIELD THEORY (10 L)

Introduction and need of Crystal Field Theory(CFT), Assumptions, Shapes and degeneracy of d orbital, Splitting of d-orbitals, Application of CFT to octahedral complexes, pairing energy(P) and distribution of electrons in e_g and t_{2g} level, calculation of magnetic moment using spin-only formula, Crystal Field Stabilization Energy (CFSE), calculation of CFSE in weak oh field and strong oh field complexes, Evidence for CFSE, Interpretation of spectra of complexes, calculation of 10 Dq and factors affecting magnitude of 10Dq, d-d transitions and colour of the complexes, Jahn-Teller distortion theorem for octahedral complexes and its illustration, CFT of tetrahedral and square planar

complexes, calculations of CFSE, Spectrochemical series, Nephelauxatic effect and Nephelauxetic series, Limitations of CFT, modified CFT (LFT), Problems related to calculation of 10 Dq, CFSE and spin only magnetic moment for octahedral, tetrahedral & square planar complexes. (i.e. for high spin & low spin complexes)

VII. MOLECULAR ORBITAL THEORY OF COORDINATION COMPLEX (06 L)

Introduction, Assumptions, MO treatment to octahedral complexes with sigma bonding, Formation of MO's from metal orbitals and Composite Ligand Orbitals (CLO), MO correlation diagram for octahedral complexes with sigma bonding, effect of π bonding, Charge transfer spectra, Comparison of VBT, CFT, and MOT.

Ref. 2 Pages 194 -236
Ref. 8 Relevant Pages
Ref. 9 Relevant Pages

Aims and objective

A student should:

i. Know the meaning of various terms involved in coordination chemistry.
ii. Know the different types of Ligands.
iii. Understand the chelating agents, chelate and stability of chelates and complexes.
iv. Calculate the charge on complex ion and the oxidation number.
v. Be able to give the IUPAC name the co-ordination compound.
vi. Know the application of co- ordination compounds in biology and chemistry.
vii. Be able to understand the Werner's formulation of complexes and identify the ionizable ions.
viii. Be able to distinguish between ionizable and non-ionizablevalencies with suitable examples.
ix. Give the suitable physical and chemical test for identification of number and types of ionizable ions.
x. Be able to draw the geometrical and optical isomerism of complexes.
xi. Choose the correct geometry for complexes with C.N. 4 and C.N. 6 with the help of stereoisomerism.
xii. Be able to define and explain isomerism in complexes.
xiii. Be able to explain various types of isomerism.
xiv. Comment on the stereoisomerism in complexes with C.N. 4 and C. N. 6.
xv. Define EAN rule and calculate EAN value of the complexes.
xvi. Comment on EAN value and stability of complexes.
xvii. Know the merits and the demerits of Sidgwick's theory.
xviii. Be able to explain the need of concept of hybridization.
xix. Explain the VB representation of tetrahedral, square planar, trigonalbipyramidal and octahedral complexes.
xx. Be able to identify which d-orbitals are involved in hybridization during formation of complexes with different geometries such as tetrahedral, square planar, trigonalbipyramidal and octahedral.
xxi. Be able to explain structure and magnetic behaviour of the complexes.
xxii. Be able to identify the high spin and low spin complexes.
xxiii. Be able to identify inner orbital and outer orbital complexes.
xxiv. Explain elctroneutrality principle and different types of pi bonding.
xxv. Know the limitations of VBT.
xxvi. Know the shapes of d-orbitals and degeneracy of d-orbitals.

xxvii. Know the assumptions of CFT.
xxviii. Understand how splitting of d-orbitals occurs when ligand approaches.
xxix. Be able to draw crystal filled splitting diagrams of d orbital of metal ion in octahedral, tetrahedral, square planer of tetragonal ligand field.
xxx. Interpret the spectra of complexes and calculate the 10 Dq.
xxxi. Understand the factors affecting magnitude of 10 Dq.
xxxii. Be able to find high spin and low spin complexes when 10 Dq and pairing energy are given.
xxxiii. Be able to explain d-d transitions and colour of the complexes.
xxxiv. Know the conditions under which Jahn-Teller distortion occurs.
xxxv. Explain, why Jahn-Teller distortion should occur in Oh complexes?
xxxvi. Be able to explain Nephelauxetic effect towards covalent bonding.
xxxvii. Explain MOT of Octahedral complexes with sigma bonding.
xxxviii. Be able to explain Charge Transfer Spectra.
xxxix. Be able to compare the different approaches to bonding in Coordination compounds.

Reference Books:

Ref. 1 Introduction to Electrochemistry by Glasstone - 2nd edition.
Ref. 2 Concise Inorganic Chemistry by J.D. Lee - 5th edition.
Ref. 3 Inorganic Chemistry, - D.F. Shiver & P.W. Atkins- C.H.Longford ELBS - 2nd edition.
Ref. 4 Basic Inorganic Chemistry, - F.A. Cotton and G. Wilkinson, Wiley Eastern Ltd 1992.
Ref .5 Concept and Model of Inorganic Chemistry by Douglas – Mc Daniels - 3rd edition.
Ref. 6 Chemistry by Raymond Chang - 5th edition
Ref. 7 New Guide to Modern Valence Theory by G.I. Brown - 3rd edition
Ref. 8 Co-ordination Compounds by Baselo and Pearson.
Ref. 9 Theoretical Inorganic Chemistry by Day and Selbin.
Ref.10 Inorganic Chemistry by A. G. Sharpe - 3rd Edition.
Ref.11 Coordination Chemistry by A. K. De.

Semester-IV
Course: Inorganic Chemistry (CH-342)

Topic	No. of Lectures
1. Chemistry of f-block element	08
2. Metals Semiconductors and Superconductors	10
3. Ionic Solids	10
4. Homogeneous Catalysis	06
5. Heterogeneous Catalysis	08
6. Bioinorganic Chemistry	06
Total Lectures	**48**

1. Chemistry of f- block elements (08 L)

Introduction of f-block elements- on the basis of electronic configurations, occurrence and reactivity, F-block elements as Lanthanide and Actinide series

I. Lanthanides

Position in periodic table, Name and electronic configuration of lanthanides, Oxidation States, Occurrence and separation (Group/ Individual) by modern methods (ion exchange and solvent extraction method), Lanthanide contraction & its effect on chemistry of Lanthanides and post-lanthanide elements, applications of lanthanides

II. Actinides

Position in periodic table, Name and electronic Configuration of actinides, Oxidation States, Occurrence, and general methods of preparation of transuranic elements [viz., a) Neutron Bombardment, b) Accelerated projectile bombardment and c) Heavy ion bombardment], Nuclear Fuels-Nuclear Fusion fuels & nuclear fission fuels, IUPAC nomenclature system for super heavy elements with atomic no. (z) greater than100, Comparison between Lanthanides and Actinides.

Ref. 2 Pages 859-863, 865-866, 874 – 875, 879-886, 891-893, 898-900

Aims and objective

A student should know:

a. The meaning of term f-block elements, Inner transition elements, lanthanides, actinides.
b. Electronic configuration of lanthanides and actinides.
c. Oxidation states of lanthanides and actinides and common oxidation states.
d. Separation lanthanides by modern methods.
e. Lanthanide contraction and effects of lanthanide contraction on post-lanthanides.
f. Use of lanthanide elements in different industries.
g. Transuranic elements.
h. Preparation methods of transuranic elements.
i. Nuclear fuels and their applications.
j. Why transuranic elements are called as the synthetic elements?
k. IUPAC nomenclature for super heavy elements with atomic no. 100 onwards.

2. Metals, semiconductors and Super conductors (10 L)

Introduction, Metallic bonding, Band theory in metals with respect to Na along with n (E) and N(E) diagrams, Electrical conductivity of metals (Na, Mg, Al), Valence electrons and conductivity of

metals, Effect of temperature and impurity on electrical conductivity of metals, Semiconductors – types of Semiconductors: I. Intrinsic II. Extrinsic, effect of temperature and impurity on semiconductivity, N & P type semiconductors ZnO and NiO, Super conductivity- Discovery, Property, Models structure and superconductivity, Applications of superconductors,

Ref. 7 Pages 209-221
Ref. 6 Related Pages

Aims and objective
A student should know:

a. The meaning of metal & semiconductor.
b. The difference between metal, semiconductor and insulator.
c. Metallic bond on the basis of band theory.
d. The energy band and energy curve.
e. Draw n (E) & N (E) curves.
f. Explain the electrical conductivity of metals with respect to valence electrons.
g. Explain the effect of temperature and impurity on conductivity of metals and semiconductors.
h. Intrinsic and extrinsic semiconductor.
i. The term valance band and conduction band.
j. n and p type of semiconductors.
k. Non-stoichiometry and semi conductivity.
l. Insulators on the basis of band theory.
m. The difference between Na, Mg, and Al in terms of valence electrons and conductivity.
n. Meaning of super conductors and their structure.
o. Discovery and applications of superconductors.

3. Ionic Solids (06 L)

Crystalline and amorphous solids, crystal structures simple cubic, body centered cubic and face centered cubic, Properties of ionic solids, packing arrangements of anions in an ionic solids, Voids in crystal structure- tetrahedral and octahedral, Ionic radius, Palings univalent and crystal radii, Conversion of univalent radii to crystal radii, problems based on conversion of radii, Radius ratio effect, Lattice energy, Born-Lande equation, Born Haber cycle and its applications, Schottky and Frenkel defect.

Ref. 2 Pages 32-61
Ref. 5 Pages 102-127
Ref. 7 Pages 55-62

Aims and objectives
A student should:

i. Know the nature of solids.
ii. Know the crystal structures of solids.
iii. Draw the simple cubic, BCC and FCC structures.
iv. Identify the C.N. of an ion in ionic solid.
v. Identify the type of void.
vi. Know the effect of radius ratio in determining the crystal structure.
vii. Be able to define Pauling's univalent radius and crystal radius.

viii. Be able to solve simple problems based on Pauling's univalent radii and crystal radii.
ix. Know how to draw Born-Haber cycle.
x. Be able to solve simple problems based on Born- Haber cycle.
xi. Know the defects in Ionic solids.
xii. Be able to differentiate between the defects.

4. Homogeneous Catalysis (06 L)

Definition, types of homogeneous catalysts, Essential properties of homogeneous catalysts, Catalytic Reactions such as:

a. Wilkinson's Catalysis
b. Zeigler Natta Catalysis
c. Monsanto acetic acid synthesis

Ref. 3 Related Pages
Ref. 6 Related Pages
Ref. 13 Pages 650-652 and 656-661

Aims and objectives

A student should:

i. Define the homogeneous catalysis.
ii. Give examples of homogeneous catalysts.
iii. Understand the essential properties of homogeneous catalysts-Give the catalytic reactions for Wilkinson's Catalysis, Zeigler Natta Catalysis, Monsanto acetic acid synthesis
iv. Give the brief account of homogeneous catalysis.

5. Heterogeneous Catalysis (08 L)

Definition, types of heterogeneous catalysts-metals, semiconductors, solid acid catalysts and supported catalysts, Essential properties of heterogeneous catalysts, Catalytic Reactions such as:

a. Oxidation- i. Synthesis of terephthalic acid from xylene using ZSM-5
   ii. Synthesis of benzoic acid from toluene using $KMnO_4$
b. Reduction- i. Hydrogenation of alkene to alkane using Raney Ni catalyst.
   ii. Synthesis of p-aminophenol from nitrobenzene using Pd/C catalyst.
c. Cyclization- Benzimidazole synthesis using o-phenenediamine and benzaldehyde by acidic support or clay-solid support, amberlist or NH_4Cl.
d. Biodiesel Synthesis- using heteropolyacid catalyst- Transesterification using phosphomolybdic or phosphotungstic acid.

Ref. 5 Related Pages
Ref. 11 Related Pages
Ref. 13 Related Pages

Aims and objectives

A student should:

i. Define the heterogeneous catalyst and heterogeneous catalysis.
ii. Give examples of heterogeneous catalysts.
iii. Understand the essential properties of heterogeneous catalysts.
iv. Give the catalytic reactions for oxidation, reduction and cyclization processes.
v. Give the brief account of biodiesel synthesis using heterogeneous catalysis.
vi. Enlist the catalysts used for benzimidazole synthesis.

vii. Understand the catalytic reactions used in industries around.

6. Bioinorganic Chemistry (06 L)

I. Introduction, Role of metals in bioinorganic chemistry-

a. Classification as enzymatic and non-enzymatic metals,
Enzymatic redox metals such as Cu (SOD) and enzymatic non redox metals such as Zn (Hydrolase).
b. Role of metal ions in non-enzymatic process- Na, K, Ca, Mg (one example of each and brief discussion).
c. Role of metals in enzymatic processes-Transition metals- Catalase, peroxidase and nitrogenase (Redox active).

II. Metalloproteins-Iron proteins-Introduction of Fe-S proteins, Electron transfer proteins (Fe-S, Fe_2S_2, Fe_3S_4, Fe_4S_4). Transport protein (transferrin) and Storage protein (ferritin)

III. Bioinorganic Chemistry of Fe: Hemoglobin and myoglobin, its structure and functions.

IV. Bioinorganic Chemistry of Co: Vitamin-B_{12}, its structure and function.

Ref. 3 Pages 782-806
Ref. 2 Pages 353, 775, 779, 796-797
Ref. 12 Pages 1-13, 24, 285-290

Aims and objective

A student should:

i. Identify the biological role of inorganic ions & compounds.
ii. Know the abundance of elements in living system and earth crust.
iii. Give the classification of metals as enzymatic and non-enzymatic.
iv. Understand the role of metals in non-enzymatic processes.
v. Know the metalloproteins of iron.
vi. Explain the functions of hemoglobin and myoglobin in O_2 transport and storage.
vii. Understand the toxicity of CN^- and CO binding to Hb.
viii. Draw the structure of Vit.B_{12} and give its metabolism.

Reference Books:

Ref. 1 Introduction to Electrochemistry by Glasstone - 2nd edition.
Ref. 2 Concise Inorganic Chemistry by J.D. Lee - 5th edition.
Ref. 3 Inorganic Chemistry, - D.F. Shiver & P.W. Atkins- C.H.Longford ELBS - 2nd edition.
Ref. 4 Basic Inorganic Chemistry, - F.A. Cotton and G. Wilkinson, Wiely Eastern Ltd 1992.
Ref .5 Concept and Model of Inorganic Chemistry by Douglas – Mc Daniels - 3rd edition.
Ref. 6 Chemistry by Raymond Chang - 5th edition
Ref. 7 New Guide to Modern Valence Theory by G.I. Brown - 3rd edition
Ref. 8 Co-ordination Compounds by Baselo and Pearson
Ref. 9 Theoretical Inorganic Chemistry by Day and Selbin
Ref.10 Inorganic Chemistry by A. G. Sharpe - 3rd Edition
Ref.11 Heterogenous Catalysis by D.K Chakrabarty and B. Vishwanathan, New Age Intl. Publishers, 1st Edn.
Ref. 12 Principles of Bioinorganic Chemistry by S. J. Lippard and J. M. Berg, Panima Publishing Corporation, 1st Edn.
Ref. 13 Inorganic Chemistry by J.E. Huheey, 4th Edn, Pearson Education.

CH-348 - INORGANIC CHEMISTRY PRACTICALS

A) Gravimetric estimations (Any 3)

1. Fe as Fe_2O_3
2. Nickel as Ni – DMG
3. Al as Aluminum oxide
4. Gravimetric estimation of Ba as $BaSO_4$ using homogeneous precipitation method.

B) Volumetric Estimations (Any 4)

1. Mn by Volhard's method
2. Estimation of NO_2^- by using $KMnO_4$.
3. Estimation of % purity of given sample of Sodium Chloride
4. Analysis of Brass-Estimation of copper by Iodometry
5. Fertilizer analysis (PO_4^{3-})

C) Inorganic preparations (Any 4)

1. Preparation of Hexamminenickel(II), $[Ni(NH_3)_6]^{2+}$.
2. Preparation of Potassium Trioxalatoferrate (III), $K_3[Fe(C_2O_4)_3]$.
3. Preparation of Tetraamminecopper (II) suplhate, $[Cu(NH_3)_4]SO_4$.
4. Preparation of Manganese (III) acetylacetonate $[Mn(acac)_3]$.
5. Preparation of Tris(Thiourea)Copper (I) Chloride $[Cu(Thiourea)_3]Cl$.

D) Colorimetric Estimations (Any 2)

1. Iron by thiocyanate method.
2. Cobalt by using R-nitroso salt method.
3. Titanium by H_2O_2.

E) Separation of binary mixture of cations by Column Chromatography (3 mixtures)

(One mixture should be colorless, Zn + Al, Zn + Mg)

OR

E) Flame Photometry (Any 3)

1. Estimation of Na by flame photometry by calibration curve method.
2. Estimation of Na by flame photometry by regression method.
3. Estimation of K by flame photometry by calibration curve method.
4. Estimation of K by flame photometry by regression method.

F) Qualitative Analysis (4 mixtures including Borates and Phosphates)

G) Visit to a chemical industry and report writing is compulsory.

Reference Books: Ref. 1 General Chemistry Experiment – Anil J Elias (University press).
Ref. 2 Vogel Textbook of Quantitative Chemical Analysis G.H. Jeffery, J. Basset.
Ref. 3 Quantitative Chemical Analysis S. Sahay (S. Chand & Co.).
Ref. 4 Quantitative Analysis R.A. Day, Underwood (Prentice Hall).
Ref. 5 Practical Chemistry K.K. Sharma, D. S. Sharma (Vikas Publication).
Ref. 6 Vogel's Textbook of Quantitative Chemical Analysis.
Ref. 7 Monograph on Green Chemistry Laboratory Experiments by Green Chemistry Task Force Committee, DST.
Ref. 8"Experimental Methods in Inorganic Chemistry." Tanaka, J. and Suib, S.L., Prentice Hall, New Jersey, 1999.

STRUCTURE OF PRACTICAL EXAMINATION

Experiment		Marks
Q.1.	Qualitative analysis OR Gravimetric Experiment*	**35**
Q.2.	Volumetric Experiment (25 Marks) Preparation (10 marks) OR Flame Photometry (20 marks) Preparation (10 marks) OR Column Chromatography (20 marks) Preparation (10 marks) OR Colorimetric Estimation (25 Marks) Preparation (10 marks)	**35**
Q.3.	Oral	**10**

*Minimum 50 % students of each batch should be allotted Gravimetric Estimation.

Semester III
Course: Organic Chemistry (CH-333)

Topic	No. of Lectures
1. Strength of organic acids and bases	03
2. Stereochemistry of disubstituted cyclohexane	06
3. Nucleophilic substitution at aliphatic Carbon	08
4. Reactions of unsaturated hydrocarbons and carbon oxygen double bond	15
5. Elimination Reactions	06
6. Aromatic Electrophilic and Nucleophilic Substitution Reactions	10
Total Lectures	**48**

1. Strength of organic acids and bases **(03)** Introduction, pk_a, origin of acidity, influence of solvent, simple aliphatic saturated and unsaturated acids, substituted aliphatic acid, phenols, aromatic carboxylic acids, pk_a and temperature, pk_b, aliphatic and aromatic bases, heterocyclic bases, acid base catalysis.

Aimsand objectives: Students should know –

1. Definition and types of organic acid and base
2. The pka and pkb concepts
3. Effect of temperature on pk_a/pk_b
4. Comparison between strengths of acids/bases
5. What is acid-base catalysis

Ref.8 (53-75), Ref. 7 Relevant pages.

2. Stereochemistry of disubstituted cyclohexane **(06)**

Introduction, 1,1-alkyl disubstituted cyclohexane; Dimethyl cyclohexane 1,2; 1,3 and 1,4. Geometrical isomerism, Optical isomerism, stability of conformation, energy calculations.

Aimsand objectives: Students should learn –

1. To draw different types of disubstituted cyclohexane in Chair form
2. To distinguish between geometrical and optical isomerism
3. Stability, energy calculations with potential energy diagram and optical activity of these conformers.

Ref. 1 Relevant pages, Ref. 3 (204-214),

3. Nucleophilic substitution at aliphatic Carbon **(08)**

Introduction, Nucleophile and leaving groups, Mechanism of nucleophilic substitution. The S_N1 reaction: Kinetics, mechanism and stereochemistry (Racemization), stability of carbocation. The S_N2 reaction: Kinetics, mechanism & stereochemistry (inversion). How to know whether a given reaction will follow S_N1 or S_N2 mechanism.Comparison of S_N1 & S_N2 reactions.S_Ni reaction and mechanism.

Aimsand objectives: Students should understood –

1. Definition and type of nucleophiles and leaving groups
2. Different types of nucleophilic substitution reactions
3. Definition of inversion and racemization
4. The kinetics, mechanism & stereochemistry of these reactions
5. Whether a given reaction follows $_{SN}1$ or $_{SN}2$ mechanism?
6. The comparison between S_N1 & S_N2 reactions
7. An S_Ni mechanism in presence and absence of pyridine
8. To predict product/s or supply the reagent/s for these reactions

Ref.1. Pages 172-203 and 208 to 210 Ref.8.Relevant pages

4. Reactions of unsaturated hydrocarbons and carbon oxygen double bond (15)

a) Reaction of Carbon-Carbon double bond: Introduction, Mechanism of electrophilic addition to C=C bond. Orientation & reactivity, Rearrangements, (Support for formation of carbocation). Addition of hydrohalogen, Anti Markownikoff's addition (peroxide effect) with mechanism, Addition of halogens (dl pairs and meso isomers), hypohalous acids (HOX), Hydroxylation (Mechanism of cis and trans 1,2-diols). Hydroboration- Oxidation (Formation of alcohol), Hydrogenation (Formation of alkane), Ozonolysis (formation of aldehydes & ketones)

Ref.1. (Pages 317-323,327-343,346-355,357,360)

b) Reactions of Carbon –Carbon triple bond: Addition of hydrogen, halogens, halogen acids, water and formation of metal acetylides and its application.

Ref.1 (Pages 431-433)

c) Reactions of Carbon –Oxygen double bond:

Introduction, Structure of carbonyl group, reactivity of carbonyl group, addition of Hydrogen cyanide, alcohols, thiols, water, ammonia derivatives, Cannizzaro and Reformaski reactions with mechanism.

Aimsand objectives: Students should know –

1. Different types of carbon-carbon unsaturated compounds
2. Orientation / rules in addition reactions
3. The structure of carbonyl group
4. Reactivity concept
5. Correct mechanism of addition reactions using different reagents
6. Types of some known addition reactions
7. To predict product/s or supply the reagent/s for such reactions.

Ref.1.Relevant pages

5. Elimination Reactions (06)

Introduction; 1,1; 1,2 elimination,E1, E2 and E1cB mechanism with evidences, Hoffmann and Saytzeff's elimination, reactivity effect of structure, attacking and leaving groups.

Aimsand objectives: Students should learn –

1. Definition and types of elimination reactions
2. Different types of bases and leaving groups

3. Statement of Hoffmann and Saytzeff rule
4. The evidences, mechanism & stereochemical aspects of these reactions
5. Whether a given reaction follows E1, E2 or E1cB mechanism?
6. Comparison between E1 & E2 reactions
7. The effect of structure, attacking and leaving group on reactivity of such reactions
8. To predict product/s or supply the reagent/s for these reactions

Ref. 1. (Pages 290-310)

Ref. 2.Relevant Pages.

6. Aromatic Electrophilic and Nucleophilic substitution reactions (10)

Introduction, arenium ion mechanism, Effect of substituent group (Orientation, o/p directing and meta directing groups). Classification of substituent groups (activating and deactivating groups) Mechanism of – Nitration, Sulfonation, Haloganation, Fridel-Crafts reactions, Diazo Coupling reactions, Ipso-substitution.Addition-elimination (S_NAr), S_N1, Elimination-addition (Benzyne) S_NR1 reactions, reactivity.

Aimsand objectives: Students should understood –

1. Definition and types of aromatic substitution reactions
2. Classification of directing groups
3. What is an arenium ion and Ipso substitution?
4. The evidences, reactivity and mechanism of these reactions
5. Whether a given reaction follows addition-Elimination or Elimination-addition mechanism?
6. To predict product/s or supply the reagent/s for these reactions

Ref 1-(Pages 517-544, 666-67), Ref 7 and 8- Relevant Pages.

Reference Books:

1) Organic Chemistry by Morrison and Boyd 6thEdn
2) Organic Chemistry by Cram and Hammond.
3) Stereochemistry of Organic compounds by Eliel Tata McGraw Hill 1989.
4) Organic Chemistry by John McMurryVthEdn. 1999
5) Organic Chemistry by Graham Solomans
6) Organic Chemistry by I.L.FinarVol.IIVthEdn.
7) Organic Chemistry by Clayden, Greeves, Warren and Wothers (Oxferd Press)
8) A guide book to reaction Mechanism by Peter Sykes VI thEdn.

Semester IV
Course: Organic Chemistry (CH-343)

Topic	No. of Lectures
1. Carbanions and their reactions	06
2. Retrosynthetic analysis and applications	05
3. Rearrangement reactions	06
4. Spectroscopic methods in structure determination of Organic compounds	24
5. Natural Products	07
Total Lectures	**48**

1. Carbanions and their reactions (06)

Introduction, Formation and stability of Carbanion. Reactions involving carbanions and their mechanisms: Aldol, Claisen, Dieckmann and Perkin condensations. Synthesis and Synthetic applications of Malonic ester, Acetoacetic ester and Wittig reagent.

Aimsand objectives: Students should know –

1. Definition and formation of carbanions
2. Possible mechanism of some known name reactions involving carbanions
3. Synthetic applications some reagents
4. To predict product/s or supply the reagent/s for these reactions

Ref. 2 (270-299).

2. Retrosynthetic analysis and applications (05)

Introduction, Different terms used – Disconnection, Synthons, Synthetic equivalence, FGI, TM. One group disconnection, Retrosynthesis and Synthesis of target molecules: Acetophenone, Crotonaldehyde, Cyclohexene, Benzylbenzoate, and Benzyl diethyl malonate.

Aimsand objectives: Students should learn –

1. Meaning of terms Disconnection, Synthons, Synthetic equivalence, Functional Group Interconversion, Target Molecule
2. What is retrosynthesis?
3. Various steps involved in the synthesis of some molecules (detailed mechanism is not expected)

Ref.3 Relevant pages

Ref.4. Relevant pages

3. Rearrangement reactions (06)

Introduction, Mechanism of rearrangement reaction involving carbocation, nitriene and oxonium ion intermediate.Beckmann, Bayer-Villiger, Pinacol-pincolone, Curtis, Favorski, Claisen rearrangement.

Aimsand objectives: Students should understood –

1. What is rearrangement reaction?
2. Different types of intermediate in rearrangement reactions?
3. To write mechanism of some named rearrangement reactions

Ref. 8. (Pages 86-90,105,112,122,158)
Ref. 6.Relevant Pages.

4. Spectroscopic methods in structure determination of Organic compounds (24)

Introduction, meaning of spectroscopy, nature of electromagnetic radiation, wave length, frequency, energy, amplitude, wave number, and their relationship, different units of measurement of wavelength frequency, different regions of electromagnetic radiations. Interaction of radiation with matter.Excitation of molecules with different energy levels, such as rotational, vibrational and electronic level. Types of spectroscopy and advantages of spectroscopic methods.

Aimsand objectives: Students should know –

1. What is Spectroscopy?
2. Different regions of electromagnetic radiations
3. Various terms used in spectroscopy
4. What is the interaction of radiation with matter
5. Types of energy levels with diagram
6. Brief idea about the advantages of spectroscopic methods

Ref-5.(Pages 1-3, 7-11), Ref. 9 and 10 Relevant pages.

A) Ultra Violet Spectroscopy

Introduction, nature of UV, Beer's law, absorption of UV radiation by organic molecule leading to different excitation. Terms used in UV Spectroscopy- Chromophore, Auxochrome, Bathochromic shift(Red shift), hypsochromic shift(Blue shift), hyperchromic and hypochromic effect. Effect of conjugation on position of UV band. Calculation of λmax by Woodward and Fisher rules for dienes and enone systems, Colour and visible spectrum, Applications of UV Spectroscopy- Determination of structure, Determination of stereo chemistry (Cis and trans)

Aimsand objectives: Students should learn –

1. What is UV Spectroscopy and Beer's law?
2. Different types of electronic excitations
3. Various terms used in UV spectroscopy
4. What is the effect of conjugation on UV band
5. To calculation of λmax for dienes and enone systems
6. Define colour?
7. What is the range of vision region ?
8. Applications of UV Spectroscopy

Ref-5. (Pages 13-15, 18-38)

B) Infra red Spectroscopy

Introduction, Principle of IR Spectroscopy, Fundamental modes of vibrations (3N-6, 3N-5) Types of vibrations (Stretching and bending), Hooks law, Condition for absorption of IR radiations, vibration of diatomic molecules. Regions of IR Spectrum: fundamental group region, finger print region aromatic

region, Characteristic of IR absorption of functional groups: Alkanes, alkenes, alkynes, alcohol, ethers, alkyl-halides, carbonyl compounds (-CHO, C=O,-COOR-COOH), amines, amides and Aromatic Compounds and their substitution Patterns. Factors affecting on IR absorption: Inductive effect, resonance effect, hydrogen bonding. Application of IR Spectroscopy in determination of structure, chemical reaction and hydrogen bonding.

Aimsand objectives: Students should understood–

1. What is IR Spectroscopy?
2. To calculate fundamental modes of vibrations for a given molecule
3. Which factors affect IR band position?
4. To distinguish compounds by this spectroscopic method
5. To determine structure and follow the course of reaction by IR spectrum

Ref-5.(Pages 46-51, 53, 54,72-81, 86)

C) PMR Spectroscopy

Introduction, Principles of PMR Spectroscopy, Magnetic and nonmagnetic nuclei, Precessional motion of nuclei without mathematical details, Nuclear resonance, chemical shift, shielding, & deshielding effect. Measurement of chemical shift, delta and Tau-scales. TMS as reference and its advantages, peak area, integration, spin-spin coupling, coupling constants, *J*-value (Only first order coupling be discussed)

Aimsand objectives: Students should know–

1. What is the principle of PMR?
2. Various terms used in PMR spectroscopy.
3. Why TMS is used as a reference compound?
4. To distinguish compounds by PMR

Ref-5. (Pages 95-98, 106-108)

D) Problems based on U.V., I.R. and PMR.

Ref-1, 9 and 10.

5) Natural Products (07)

Terpenoids: Introduction, Isolation, Classification. Citral- structure determination using chemical and spectral methods, Synthesis of Citral by Barbier and Bouveault Synthesis.

Alkaloids: Introduction, extraction, Purification, Some examples of alkaloids and their natural resources. Ephedrine- structure determination using chemical methods.Synthesis of Ephedrin by Nagi.

Aimsand objectives: Students should learn–

1. What are terpenoids and alkaloids?
2. Various methods of isolation/extraction of these natural products.
3. Synthesis of Citral and Ephedrin by Barbier- Bouveault and Nagi methods, respectively.
4. To determine the structure of above compounds by chemical methods.

Ref-6 (1437-1440) Ref.7.Relevant Pages.

Reference Books :

1. Organic Chemistry by Morrison and Boyd. VIthEdn.
2. A guide book to reaction mechanism by Peter Sykes VIthEdn.
3. Designing organic Synthesis by Stuart Warren 1983
4. Organic Chemistry by Cram and Hammond
5. Absorption Spectroscopy of Organic Molecules by V. M. Parikh 1974
6. Organic Chemistry by Clayden, Greeves, Warren and Wothers
7. Organic Chemistry by I. L. Finar Vol. II VthEdn.
8. Reactions, Rearrangements and reagents by S. N. Sanyal
9. Introduction Spectroscopy by Pavia
10. Spectroscopic identification of organic molecules by Silverstein

Organic Chemistry Practical (CH-349)

A) Separation of Binary Mixtures and Qualitative Analysis (8 Mixtures)

Solid-Solid (4 Mixtures), Solid-Liquid (2 Mixtures), Liquid-Liquid (2 Mixtures).

At least one mixture from each of the following should be given-Acid-Base, Acid-Phenol, Acid-Neutral, Phenol-Base, Phenol-Neutral, Base-Neutral and Neutral- Neutral.

Name and structure of the separated components of the binary mixture is not necessary. Students are expected to record the- Type, Separation of mixture, Preliminary tests, Physical constants, Elements and Functional groups only. The purified samples of the separated components should be submitted. Separation and qualitative analysis of the binary Mixtures should be carried out on micro scale using micro scale kits.

B) Organic Estimations (Four)

i. Estimation of acetamide.

ii. Estimation of Glucose.

iii. Estimation of Ethyl benzoate.

iv. Determination of Molecular weight of Monobasic acids by Volumetric Methods.

v. Determination of Molecular weight of Dibasic acids by Volumetric Methods.

C) Organic Preparations (Eight)

Preparation of: Adipic acid from cyclohexanone (Oxidation by Con. HNO_3)

Benzoquinone from Hydroquinone (Oxidation by $KBrO_3/K_2CrO_3$)

P-nitroacetanilide from Acetanilide (Nitration)

B-Napthyl ether from B-napthol (Methylation by DMS, NaOH)

Hippuric acid from Glycine (Benzoylation)

P-Iodonitrobenzene from P-Nitroaniline (Sandmeyer Reaction)

Benzoic acid from Ethyl benzoate (Ester hydrolysis)

P-Bromacetanilide from Acetanilide (Bromination)

Paraacetomol from P-Hydroxyaniline (Acetylation)

Ethylbenzene from Acetophenone (Wolff Kishner reduction)

The preparation should be carried out on small scale. The starting compound should not be given more than one gm. Double burette method should be used for titration. Monitoring of the reaction and purification should be carried out by recrystallization and purity of the product in preparation should be checked by physical constant(M.P/B.P.) determination and thin layer Chromatography (TLC) with proper selection of the solvent system.

Reference Books

1) Practical Organic Chemistry by – A.I. Vogal.
2) Practical Organic Chemistry by – O.P. Agarwal.

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STRUCTURE OF ANNUAL PRACTICAL EXAMINATION

1. Binary Mixture separation and qualitative Analysis	40 Marks
2. Organic Estimation/ Preparation	30 Marks
3. Oral	10 Marks

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Semester-III

Course: Analytical Chemistry (CH-334)

Sr. No.	Topic	No. of Lectures
1	Gravimetric Analysis	12
2	Thermal methods of analysis	06
3	Spectrophotometry	10
4	Polarography	08
5	Atomic Absorption Spectroscopy	06
6	Flame Emission Spectroscopy	06
Total Lectures		**48**

1. Gravimetric Analysis (12 L)

Common ion effect and solubility product principles, Conditions for good precipitation,Factors affecting precipitation like acid, temperature, nature of solvent,Super saturation and precipitation formation,Precipitation from homogeneous solution and examples, Co-precipitation, post-precipitation and remedies for their minimization, Washing of precipitate and ignition of precipitate,Brief idea about method of filtration and drying of precipitate, Introduction to electrogravimetry: principle, applications, electrolytic separations of Cu and Ni, Numerical problems only on gravimetric analysis.

Ref. 1. Pg. 22-28, 30-33, 95, 107-114, 169-171, 403-404, 407-415
Ref. 3. Pg. 527-532

Aims and Objectives

Student should know,

1. Principles of common ion effect and solubility product
2. Formation of complex ion
3. Factors affecting on solubility of precipitation
4. Phenomenon of super saturation and precipitation formation
5. Meaning of co-precipitation and post precipitation
6. Choice of liquid for washing the precipitate
7. Precautions during filtration, drying and ignition of precipitate
8. Conceptual understanding of electrogravimetric principle
9. Numerical Problems

2. Thermal methods of analysis (06L)

Principle of thermal analysis, classification of thermal techniques, Principle, instrumentation and applications of TGA and DTA, factors affecting the thermal analysis, numerical problem.

Aims and Objectives

Student should know,

1. Methods of thermo gravimetric analysis

2. Principles of TGA and DTA
3. Types of TGA
4. Relation between TGA and DTA
5. Thermal equation of TGA
6. Different factors affecting TGA curve
7. Determination of calcium oxalate precursor
8. Applications of TGA, DTA and DSC

Ref. 1. Pg. 515-527,531-537

Ref. 6 Pg. 732-737

3. Spectrophotometry (10 L)

Introduction, Electromagnetic spectrum, Interaction of electromagnetic radiations with the matter, Mathematical Statement and derivation of Lambert's Law and Beer's Law, Terminology involved in spectrophotometric analysis, Instrumentation of single beamcolorimeter, Instrumentation of single and double beam spectrophotometer, Principle of additivity of absorbance and simultaneous determination, Spectrophotometric Titrations, Experimental Applications-Structure of organic compounds, Structure of complexes, Numerical Problems

Ref. 1 Pg. 693-705

Ref. 3 Pg. 144-153, 157-160, 170-174

Aims and Objectives

Student should know,
1. Principles of Spectrophotometric analysis and properties of electromagnetic radiations
2. Different Terms like absorbance, transmittance, and molar absorptivity
3. Mathematical Statement and derivation of Lambert's Law and Beer's Law
4. Different wavelength selectors and their importance
5. Instrumentation and working of single and double beam spectrophotometer
6. Additivity Principle
7. Different methods of color comparators
8. Applications
9. Numerical Problems

4. Polarography (08 L)

Introduction to voltammetric methods of analysis, Principles of polarographic analysis, Dropping Mercury Electrode, Instrument and working of polarographic apparatus, Ilkovic equation and quantitative analysis, Polarogram and chemical analysis, Analysis of mixture of cations, Factors affecting polarographic wave, Quantitative Applications, Numerical Problems

Ref.6. 691-734

Aims and Objectives

Student should know,
1. Voltammetry and polarography as an analytical tool
2. Construction, working, advantages and disadvantages of DME

3. Different terms involved in Ilkovic equation
4. Determination of Zn and Cd from the mixture
5. Significance of the different terms involved.
6. Need of removal of dissolved oxygen from analyte solution
4. Applications and numerical problems

5. Atomic Absorption Spectroscopy (06 L)

Introduction and theory of atomic absorption spectroscopy, Instrumentation of single beam atomic absorption Spectrophotometer, Measurement of absorbance of atomic species by AAS, Spectral and Chemical Interferences, Qualitative and Quantitative Applications of AAS. Numerical Problems.

Ref. 3. Pg. 321-342

Aims and Objectives
Student should know,
1. Atomic absorption spectroscopy as an analytical tool
2. Measurement of absorbance of atoms by AAS.
3. Interferences in atomic absorption spectroscopy
4. Applications and numerical problems

6. Flame Emission Spectroscopy (06 L)

Introduction and theory of atomic emission spectroscopy, Instrumentation of single beam flame emission spectrophotometer, Measurement of emission of atomic species, Interferences in emission spectroscopy, Methods of analysis- calibration curve method, Standard addition method, and internal, standard method, Qualitative and Quantitative Applications of FES, Numerical Problems.

Ref. 3. Pg. 321-322, 336-341, 364-370, 372-376

Aims and Objectives
Student should know,
1. Emission spectroscopy as an analytical tool
2. Measurement of emission of atomic species
3. Different methods of analysis
4. Application and numerical problems.

References
Ref.1 Textbook of Quantitative Chemical Analysis- 3rd Edition, A. I. Vogel
Ref.2 Principles of Physical Chemistry 4th edition – Prutton and Marron
Ref.3 Instrumental Methods of Chemical Analysis- Chatwal and Anand
Ref.4 Basic Concept of Analytical Chemistry-2nd edition S.M. Khopkar
Ref.5 Vogel's textbook of Quantitative Inorganic Analysis-4th edition
Besset Denney, Jaffrey, Mendham
Ref.6 Instrumental Methods of Chemical Analysis- 6th edition
Willard, Merritt, Dean and Settle
Ref.7 Analytical Chemistry by Skoog
Ref.8 Introduction to Instrumental Analysis- R.D. Braun
Ref.9 Instrumental methods of Chemical Analysis-Willard, Dean & Merrit-6th Edition

Semester-IV

Course: Analytical Chemistry (CH-344)

Sr. No.	Topic	No. of Lectures
1	Solvent Extraction	08
2	Chromatography	10
3	Gas Chromatography	09
4	High Performance Liquid Chromatography	09
5	Electrophoresis	06
6	Nephelometry and Turbidimetry	06
Total Lectures		**48**

1. Solvent Extraction (08L)

Introduction, Principle of solvent extraction, Distribution coefficient, distribution ratio, relationbetween Distribution coefficient and distribution ratio, factors affecting solvent extraction,percentage extracted, solvent extraction method, separation factor, batch extraction, counter currentextraction, application of solvent extraction, numerical problems.

References: 3,4,7,9 relevant pages**.**

Aims and Objectives

A student should know,

i) Principles of solvent extraction.

ii) Difference between KD and D

iii) Various types of techniques of solvent extraction such as-

(a) extraction (b) continuous extraction (c) counter current extraction.

iv) Difference between batch and multiple extraction.

v) Advantages and applications of solvent extraction.

vi) To solve the numerical problems.

2. Chromatography (10L)

Introduction and classification of chromatographic methods, Principle of chromatographic analysis with match box model, Theoretical plates and column efficiency, Theory, Principle, technique and applications of-Column Chromatography, Ion exchange Chromatography, Thin layer Chromatography, Paper Chromatography, Numerical Problems

Ref. 1-8 Relevant pages

Aims and Objectives

Student should know:

1. Principle of chromatographic methods
2. Relation between theoretical plates and column efficiency
3. Technique and applications of- Column Chromatography,
4. Technique and applications of- Thin layer Chromatography
5. Technique and applications of- Paper Chromatography

6. Technique and applications of- Ion exchange Chromatography
7. Numerical Problem

3. Gas Chromatography (09 L)

Introduction, Theory, Principle, GSC and GLC, Separation mechanism involved in GSC and GLC, Instrumentation of Gas chromatography, Working of gas chromatography,Gas chromatogram and qualitative-quantitative analysis, Applications of gas chromatography

Ref. 1. Pg. 167-174

Ref. 4. Pg. 454-464

Ref. 5 Pg. 624-640

Aims and Objectives
Student should know,
1 Principle of GSC and GLC analysis
2. Separation mechanism involved in GSC and GLC
3. Instrumentation- stationary phases, column types, detectors
4. Working of gas chromatographic apparatus.
4. Chromatogram and use in qualitative-quantitative analysis
5. Applications of gas chromatography

4. High Performance Liquid Chromatography (09 L)

Introduction, Need of liquid chromatography, Separation mechanism involved in adsorption and partition HPLC, Instrumentation and working of HPLC, Applications of HPLC, Introduction to supercritical fluid chromatography

Ref. 6. Pg. 529-545

Ref. 4. Pg. 178-183

Aims and Objectives
Student should know,
1 Need of liquid chromatography
2. Separation mechanism involved in adsorption and partition HPLC
3. Instrumentation and working of HPLC
4. Applications of HPLC
5. Advantages of supercritical fluid chromatography

5. Electrophoresis (06L)

Introduction, Principle and theory of electrophoresis, Different types of electrophoresis techniques, Moving Boundary Electrophoresis, Zone electrophoresis- Paper, Cellulose acetate and Gel electrophoresis, Applications of electrophoresis

Ref. 3 and Ref. 4 relevant pages

Aims and Objectives
Student should know,
1 Comparison between electrophoresis and chromatography

2. Principle and theory of electrophoresis
3. Different types of electrophoresis techniques
Applications of electrophoresis

6. Nephelometry and Turbidimetry (06L)

Introduction, Principles and instrumentation of Nephelometric and Turbidimetric analysis, Difference between Nephelometric and Turbidimetric measurements, Choice between Nephelometry and Turbidimetry, Factors affecting Nephelometric and Turbidimetric measurements, Quantitative Applications, Numerical Problems

Ref.1. Pg.781-785

Ref.3. Pg.380-390

Aims and Objectives
Student should know,
1. Nephelometry and Turbidimetry as an analytical tool
2. Measurement of turbidance
3. Difference between Nephelometry and Turbidimetry
4. Application and numerical problems

List of References

Ref.1 Textbook of Quantitative Chemical Analysis- 3rd Edition, A. I. Vogel

Ref.2 Principles of Physical Chemistry 4th edition – Prutton and Marron

Ref.3 Instrumental Methods of Chemical Analysis- Chatwal and Anand

Ref.4 Basic Concept of Analytical Chemistry-2nd edition S.M. Khopkar

Ref.5 Vogel's textbook of Quantitative Inorganic Analysis-4th edition
Besset Denney, Jaffrey, Mendham

Ref.6 Instrumental Methods of Chemical Analysis- 6th edition
Willard, Merritt, Dean and Settle

Ref.7 Analytical Chemistry by Skoog

Ref.8 Introduction to Instrumental Analysis- R.D. Braun

Ref.9 Instrumental methods of Chemical Analysis-Willard, Dean & Merrit-6th Edition

Semester- III

Course: Industrial Chemistry (CH-335)

Topics	No. of lectures
1. Modern Approach to Chemical Industry	08
2. Agrochemicals	08
3. Manufacture of Basic Chemicals	08
4. Petrochemicals and eco-friendly fuels	08
5. Food and Starch Industry	08
6. Cement and Glass industry	08
Total Lectures	**48**

1. Modern Approach to Chemical Industry (08)

Introduction, basic requirements of chemical industries, chemical production, raw materials, unit process and unit operations, Quality control, quality assurance, process control, research and development, pollution control, human resource, safety measures, classification of chemical reactions, batch and continuous process, Conversion, selectivity and yield, copy right act, patent act, trade marks

Ref. 1: Chapter 2 (relevant pages)

2. www.wikipedia.org/wiki/copyright_act_of1976

3. www.wikipedia.org/wiki/patentact

4. www.wikipedia.org/wiki/trademark

2. Agrochemicals (08)

General introduction and scope of agrochemicals, meaning and examples of: Insecticides, Herbicides, Fungicides, Rodenticides, Pesticides, Plant growth regulators. Pesticide formulation, slow release pesticide formulations, storage stability test, and Industrial entomology. Advantages and disadvantages of agrochemicals. Structure,: DDT, BHC, Warfarin, Aldrin, Endosulphan,synthesis and application:DDT, BHC andEndosulphan. Biopesticides like Neem oil and Karanj oil.

Ref. No. 5-7

3. Manufacture of Basic Chemicals (08)

a) Ammonia: Physicochemical principles involved, Manufacture of ammonia by modified Haber-Bosch process, its uses.

b) Sulphuric acid: Physicochemical principles involved, Manufacture of sulphuricacid by contact process, its uses.

c) Nitric acid: Physicochemical principles involved, Manufacture of nitric acid by Ostwald's process, its uses.

Ref.No.1: P.No. 571 to 588, 618 to 664

4. Petrochemicals and eco-friendly fuels (08)

a) Introduction, occurrence, composition of petroleum, resources, processing of petroleum, calorific value of fuel, cracking, octane rating (octane number), cetane number, flash

point, and petroleum refineries, applications of petrochemicals, synthetic petroleum, lubricating oils & additives

b) *Fuels and eco-friendly fuels:* liquid, gaseous fuel (LPG, CNG), fossil fuels, diesel, bio diesel, gasoline, aviation fuels. Use of solar energy for power generation.

Ref. 15, 16, 17

5. Food and Starch Industry (08)

Food Industry:

(a) Definition and scope, nutritive aspects of food constituents, , food deterioration factors and their control; (b) Preservation and processing: Heat and cold preservation and processing, cold storage, food dehydration and concentration, various foods, their processing and preservation methods, fruits, beverages, cereals, grains, legumes and oil seeds; (c) Food additives: Enhancers, sugar substitutes, sweeteners, food colors,

Ref.12

Starch industries:

Chemistry of starch, manufacturing of industrial starch and its applications, characteristics of some food starches, non-starch polysaccharides-cellulose-occurrence.

Ref. 11

6. Cement and Glass industry (08)

Cement industry:

Introduction, Importance, composition of portland cement, raw materials, proportioning of raw materials, setting and Hardening of cement, reinforced concrete.

Ref.1: P.No. 313-333 Ref. 8: P.No173-176, Ref. 10: P.No.188-192

Glass industry

Introduction, importance, physical and chemical properties of glass, chemical reaction, annealing of glass Special glasses: colored, safety, hard, borosilicate, optical, photosensitive, conducting, glass laminates.

Ref.1: *P. No*.160-171;Ref. 8: *P. No*. 247-265; Ref.9: *P. No*. 197-212

Aims and objectives

1. Modern Approach to Chemical Industry

The students are expected to learn;

i. Importance of chemical industry,

ii. Meaning of the terms involved,

iii. Comparison between batch and continuous process,

iv. Knowledge of various industrial aspects

2. Agrochemicals

Students should know the

i. Various insecticides,

ii. Pesticides,
iii. Fungicides,
iv. Rodenticides &biopesticides used in agriculture field with their synthesis and applications.

3. Manufacture of Basic Chemicals

Students should know the
i. Concept of basic chemicals,
ii. their uses and manufacturing process.
iii. They should also know the physic chemicals principals involved in manufacturing process

4. Petrochemicals and eco-friendly fuels

Introduction, occurrence, composition of petroleum, resources, processing of petroleum, other properties
Fuels and eco-friendly fuels, use of solar energy etc.

5. Food and Starch Industry

Food Industry:

Students should know
i. Scope,
ii. Nutritive aspects of food constituents,
iii. Quality factors and their measurements,
iv. Food deterioration factors and their control;
v. Food preservation and Food additives

Starch Industry:

Students should know about the
i. Chemistry of starch,
ii. Manufacturing of industrial starch and its applications,
iii. Characteristics of some food starches,
iv. Non-starch polysaccharides-cellulose-occurrence

6. Cement and Glass industry

Cement industry

The students are expected to
i. Learn importance of these industries,
ii. Manufacture of cement by modern methods
iii. Definition of setting and hardening
iv. Reinforced concrete

Glass industry

The students are expected
i. To learn about making of glass by different methods,
ii. Various operations involved in the manufacture and compositions,
iii. Properties and uses of special glasses.

References

1. Industrial Chemistry-B.K. Sharma, Goyal publishing house, Mirut, Chapter 2 (relevant pages)
2. www.wikipedia.org/wiki/copyright_act_of1976
3. www.wikipedia.org/wiki/patentact
4. www.wikipedia.org/wiki/trademark
5. Insects and Pesticides, Saxena A B, Anmol Publications
6. Emergency Medicine: Chapter 146 Insecticides, Herbicides & Rodenticides, by James Adams
7. Growth Regulators in Agriculture and Horticulture, by Amarjit Basra, CRC Press, 2000
8. Shreeve's chemical process industries 5th Edition, G.T. Oustin, McGraw Hill
9. Riegel`s hand book of Industrial chemistry, 9th Edition, Jems A. Kent
10. Industrial chemistry –R.K. Das, 2nd Edition, 1976.
11. Chemistry and industry of starch, New York, N.Y., Academic Press, incby Kerr, Ralph Waldo Emerson
12. The Complete Manual Of Small-Scale Food Processing, by Peter Fellows, Practical Action Pub
13. Polymeric Materials, C. C. Winding and G. D. Hiatt McGraw Hill Book Co. Polymer Science by Gowarikar
14. Polymer science, Bill Meyer, F. W. Jr. John Wiley& sons
15. The Petroleum chemicals industry by R. F. Goldstine, e &Fn London
16. Fundamentals of petroleum chemical technology by P Below.
17. Petro Chemicals Volume 1 and 2 ; A Chauvel and Lefevrev ; Gulf Publishing company
18. Perfumes Soaps Detergents & Cosmetics (Soaps & Detergents) (Volume 1) 1st Edition, CBS Publisher
19. Dyes & Paints: A Hands-On Guide to Coloring Fabric, by Elin Noble

Semester- IV
Course: Industrial Chemistry (CH-345)

Topics	No. of lectures
1. Polymer chemistry	10
2. Sugar and Fermentation Industry	08
3. Soap, detergents and Cosmetics	08
4. Dyes and paints	08
5. Chemistry of pharmaceutical industries	08
6. Pollution prevention and waste management	06
Total Lectures	**48**

1. Polymer chemistry **(10)**

Classification of Polymers: Organic and Inorganic polymers

(a) Basic concepts, nomenclature, degree of polymerization, classification of polymerization reactions, thermodynamic and transport properties of polymer

b)*Commercial polymers and their importance:* (a) Nylon, polyesters (terylene and dacron), rubber, vulcanization of rubber, synthetic rubber, Bun 2-N rubber, copolymers of butadiene, PVC, acrylic, teflon, polyethylene and acrylonitrile; (b) Silicone polymers: silicone oils, rubber, grease and resin; (c) Resins: Phenol-formaldehyde resins, urea-formaldehyde resins, epoxy resins, melamine-formaldehyde resins;

Ref. 13, 14

2. Sugar and Fermentation Industry **(08)**

Sugar: Occurrence, Manufacturing of refine cane sugar from sugar cane, general idea of carbonation and sulphitation processes and their comparison, by-product and their use.

Ref.8-10

Fermentation Industry:

Introduction, importance, Basic requirement of fermentation process, Manufacture of industrial alcohol from molasses, fruits, food grains, & ethylene, Manufacturing of wine, beer, whisky, rum ; importance Power alcohol

Ref. 1, 8-10

3. Soap, detergents and Cosmetics **(08)**

A. Chemistry of soap, row material, chemical reaction, types of soap.
B. Meaning of the terms detergent and surfactants, emulsion and emulsifying agents, wetting and non-wetting, hydrophobic and hydrophilic nature, amphipathic structures, types of surfactants, raw materials for detergents, washing action of soaps and detergents, detergent builders, additives.

C. Raw materials: emulsifiers (natural, synthetic and finely dispersed solids), lipid components (oils, waxes, fats), humectants, colours (dyes and pigments), preservatives and antioxidants. (b) Cosmetics for skin: Types and problems of skin, key ingredients of skin cleansing, toners, moisturizers, nourishing, protective sunscreen, talcum powder and bleaching products. (c) Hair care: classification, ingredients, special additives for conditioning and scalp health, hair colourants (temporary, semi-permanent and gradual colourants), the plant materials (herbs) used in hair cosmetics.

Ref. 18.

4. Dyes and paints

(a)*Dyes:* Introduction, classification of dyes: Structures and applications, nitro, nitroso, azo, heterocyclic, phthalenes, xanthenes, rhodamines, thiazine, cyanine, anthraquinone, indigoids, thioindigoids, phthalocyanines, wet dyes.

(b) *Paints:* Introduction of paints, ingredients and classification, new technologies; properties of coatings; solvents, plasticizers, dyes and bioactive additives;

(c) *Pigments:* Introduction, classification and general physical properties.

Ref.1: P. No.777-814; Ref.9: P. No.863-915 ;Ref.10 Relevant page
Ref. 19.

5. Chemistry of pharmaceutical industries (08)

a. *General aspects of drug action:* Introduction, classification, nomenclature, structure-activity relationship, action of drugs, factors affecting drug action, metabolism of drugs, chemical structures, methods of production and pharmacological activity.

b. Meaning of the terms: Prescriptions, doses, analgesic, antipyretic, diuretic, anesthetics, antibiotics, anti-inflammatory, anti-viral, tranquilizer, antiulcer, antialargic and bronchodilators, cardiovascular, cold preparations, anti-hypertensive, cough preparation, anti-neoplastic, sedative and hypnotics, steroidal, contraceptive, histamine and antihistamine.

c. Synthesis and uses: Paracetamol, Aspirin, Sulphanilamide.

Ref.1: P. No.762-775; Ref.8: P. No.803-804, 818-822 ; Ref.9: P. No.987-1011

6. Pollution prevention and waste management (06)

Introduction, importance of waste management, concept of atom economy, Terms involved in waste minimization: source reduction, recycling, product changes, source control, use and reuse, reclamation, assessment procedures, types of wastes, treatment and disposal of industrial waste. Treatment of wastes or effluents with organic impurities.Treatment of wastes or effluents with inorganic impurities. The nature, effect and treatment of some important chemical wastes-(Pulp and paper industries, soap and detergent industries and food processing
industries).

Ref. 1: P.No. 8-92; Ref.6: P.No. 15-30;
Ref. www.wikipedia.org/atom economy

Aims and Objectives:

1. Polymer chemistry

Students should know

i. Basics of polymer,
ii. ii. Nomenclature,
iii. Degree of polymerization,
iv. Classification of polymerization reactions,
v. Thermodynamic and transport properties of polymer,
vi. Commercial polymers and their importance,
vii. Biomedical polymers: implants,
viii. Contact lens and dental polymers.

2. Sugar and Fermentation Industry

The students are expected to learn

i. Importance of sugar industry,
ii. Manufacture of direct
iii. Consumption (plantation white) sugar with flow diagram.
iv. Cane juice extraction by various methods,
v. Clarification by processes like carbonation,
vi. Sulphitation,
vii. Phosphatation, etc.
viii. Concentration of juice by using multiple effect evaporator system,
ix. Crystallization of sucrose by using vacuum pan.

Fermentation Industry

i. Importance,
ii. Basic requirement of fermentation process,
iii. Manufacturing of ethyl alcohol by using molasses,
iv. Food grains, fruits & ethylene.
v. Manufacturing of wine, beer, whisky, rum etc.

3. Soap, detergents and Cosmetics

Students should know about

i. Different types of soap products,
ii. Chemistry of soap.
iii. Students should know about various cosmetics,
iv. Raw materials,
v. Properties and various types of cosmetics used.
i. Meaning of the terms detergent,
ii. Surfactants, emulsion and emulsifying agents,
iii. Wetting and non-wetting,
iv. Hydrophobic and hydrophilic nature,
v. Amphipathic structures,
vi. Types of surfactants,
vii. Raw materials for detergents,

viii. Washing action and detergents,
ix. Detergent builders, additives.

4. Dyes and paints

Students should know about

i. *Dyes:* introduction,
ii. Dye intermediates,
iii. Preparation of dye intermediates,
iv. Structural features of a dye;
v. Classification of dyes,
vi. Structures and applications,
vii. Nitro, nitroso,
viii. Azo, heterocyclic,
ix. Phthalenes,
x. Xanthenes,
xi. Rhodamines,
xii. Thiazine,
xiii. Cyanine,
xiv. Anthraquinone,
xv. Indigoids,
xvi. Thioindigoids,
xvii. Phthalocyanines, wet dyes.

(b) *Paints:*

i. Introduction of paints,
ii. Ingredients and classification,
iii. New technologies;
iv. Properties of coatings;
v. Solvents, plasticizers, dyes and bioactive additives.

(b) *Pigments:*

i. Introduction,
ii. Classification and general physical properties.

5. Chemistry of pharmaceutical industries

Students should know about

i. *General aspects of drug action:*
ii. Introduction, classification,
iii. Nomenclature,
iv. Structure-activity relationship,
v. Action of drugs,
vi. Assay of drugs and factors affecting drug action,
vii. Metabolism of drugs,
viii. Chemical structures,
ix. Methods of production and pharmacological activity.
x. Meaning of the terms of the various drugs.
xi. Synthesis and uses of few drug molecules.

6. Pollution prevention and waste management

The students are expected to learn all the problems of pollution and deposal of waste of various industries.

References

1. Industrial Chemistry-B.K. Sharma, Goyal publishing house, Mirut, Chapter 2 (relevant pages)
2. www.wikipedia.org/wiki/copyright_act_of1976
3. www.wikipedia.org/wiki/patentact
4. www.wikipedia.org/wiki/trademark
5. Insects and Pesticides, Saxena A B, Anmol Publications
6. Emergency Medicine: Chapter 146 Insecticides, Herbicides & Rodenticides, by James Adams
7. Growth Regulators in Agriculture and Horticulture, by Amarjit Basra, CRC Press, 2000
8. Shreeve's chemical process industries 5th Edition, G.T. Oustin, McGraw Hill
9. Riegel`s hand book of Industrial chemistry, 9th Edition, James A. Kent
10. Industrial chemistry –R.K. Das, 2nd Edition, 1976.
11. Chemistry and industry of starch, New York, N.Y., Academic Press, incby Kerr, Ralph Waldo Emerson
12. The Complete Manual Of Small-Scale Food Processing, by Peter Fellows, Practical Action Pub
13. Polymeric Materials, C. C. Winding and G. D. Hiatt McGraw Hill Book Co. Polymer Science by Gowarikar
14. Polymer science, Bill Meyer, F. W. Jr. John Wiley& sons
15. The Petroleum chemicals industry by R. F. Goldstine, e &fn London
16. Fundamentals of petroleum chemical technology by P Below.
17. Petro Chemicals Volume 1 and 2 ; A Chauvel and Lefevrev ; Gulf Publishing company
18. Perfumes Soaps Detergents & Cosmetics (Soaps & Detergents) (Volume 1) 1st Edition, CBS Publisher
19. Dyes & Paints: A Hands-On Guide to Coloring Fabric, by Elin Noble

Optional Course

Semester-III

Course: Nuclear Chemistry (CH-336A)

Topic	No. of Lectures
1. The Atomic Nucleus, Properties of Nucleons and Nuclei	08
2. Nuclear Models	12
3. Radioactivity	16
4. Nuclear Reactions	12
Total Lectures	**48**

1. The Atomic Nucleus, Properties of Nucleons and Nuclei (08 L)

The atom, Elementary particles, Sub-nucleons, quarks, The nucleus and outer sphere, Classification of nuclides, Nuclear stability, Even-odd nature, N/Z ratio, The Nuclear potential, Binding energy, Binding energy calculations.
The nucleus, its size, shape and radius, Mechanical effects due to orbiting and spinning of nucleons, Magnetic quantum numbers, principal and radial quantum number.

Ref.1: pages 1 to 13 and19 to 25.

2. Nuclear Models (12 L)

Historical, The shell model, Periodicity in nuclear properties: the magic numbers, The salient features of shell model, The sequence of filling the orbit, Rectangular well potential model, Harmonic oscillator potential model, Spin-orbit coupling model, Nuclear configuration of lighter nuclides ($Z < 20$), Merits of the shell model, The liquid drop model, The semi-empirical mass equation, Merits of the liquid drop model, Limitations of liquid drop model.

Ref.1 pages 64 to 69, 72 to 84 and 91 to 92.

Ref.2 pages 464 to 469

3. Radioactivity (16 L)

Discovery, Types of radioactive decay, Decay schemes,General characteristics of radioactive decays, decay kinetics, units of radioactivity, problem solving on decay kinetics.

Alpha decay: Alpha active nuclides, The alpha energy spectrum,Geiger-Nuttals law, The theory of alpha decay. **Beta decay:** Types of beta decay, absorption and range through matter, Fermi theory of beta decay. (Mathematical details are not expected) **Gamma decay:** Nuclear isomerism and isomeric transitions, internal conversion, Auger effect.

Ref.1 pages 100 to 106,120 to 135, 138 to 142, and 150 to 154.

4. Nuclear Reactions (12 L)

Bethe's notation, Types of nuclear reactions, Conservation of nuclear reactions (Conservation of protons and neutrons, Conservation of momentum and energy), Reaction cross-section, The compound nucleus theory, Calculations of excitation energy of compound nucleus, Photonuclear reactions, Thermonuclear reactions.

Ref.1 pages 160 to 174 and 192 to 196.

Aims and objectives:

1. The Atomic Nucleus, Properties of Nucleons and Nuclei:

The students are expected to know the following from this topic.

a) The atom, elementary particles,sub-nucleons and the quarks.

b) Classification of nuclides, isotopes, isobars, isotones and isomers.

c) Nuclear stability on the basis of even-odd nature of Z and N, N/Z ratio. d) The binding energy

e) The nucleus, its size and shape, mechanical effects due to orbiting and spinning ofnucleons, Magnetic quantum numbers, principal and radial quantum number.

2. Nuclear Models:

By studying this topic students are expected to understand

a) The Shell model
b) Magic number
c) Salient features of shell model
d) Nuclear configuration
e) The liquid drop model
f) Semi-empirical mass equation

3. Radioactivity:

By studying this topic students are expected to understand

a) Types of radioactive decay, decay kinetics and their general characteristics.

b) Alpha decay, Beta decay and gamma decay

c) Nuclear isomerism, isomeric transitions, internal conversion, Auger effect.

4. Nuclear Reactions:

The students are expected to understand,

a) Bethe's notation

b) Different types of Nuclear reactions.

c) Conservation in nuclear reaction

d) Excitation energy of compound nucleus

References:

1. Essentials of Nuclear Chemistry by H. J. Arnikar, 4th Revised Edition, New Age International Publishers.

2. Source book of Atomic energy by Samuel Glasstone, 3rd edition, East -West press.

Semester-IV

Course: Nuclear Chemistry (CH-346A)

Topic	No. of Lectures
1. Nuclear Fission	10
2. Nuclear Reactors	08
3. Nuclear Accelerators	08
4. Detection and measurement of nuclear radiations	08
5. Applications of Radioactivity	10
6. Radiation Safety precautions	04
Total Lectures	**48**

1. Nuclear Fission (10 L)

Introduction, Discovery of nuclear fission, The process of nuclear fission, Fission fragments and their mass distribution, Fission energy, Fission cross-section and thresholds, Fission neutrons, Theory of nuclear fission**.**

Ref.1: pages 209 to 225

2. Nuclear Reactors (08 L)

The fission energy, The natural uranium reactor, The four factor formula, The classification of reactors. Reactor power, Critical size of a thermal reactor, Breeder reactor, The fast breeder test reactor at Kalpakkam, India's nuclear energy programme.

Ref.1: pages 232 to 249

3. Nuclear Accelerators (08 L)

Electrostatic Accelerators, The cockcroft-walton Accelerator,The Vande-Graft Accelerator, Cyclic Accelerator, Linear Accelerator**.**

Ref: 2 Pages 290 to 305,325 to 330

4. Detection and measurement of nuclear radiations (08 L)

Scintillation Counters, Semiconductor detectors, Neutron detectors.

Ref.2 Pages 211 to 222.

5. Applications of Radioactivity (10 L)

Probing by isotopes, Typical reactions involved in the preparation of radioisotopes, Szilard-Chalmer reaction, Cow and milk system, Use of charged plates in the collection of radioisotopes, Radiochemical principles in the use of tracers, Analytical applications: Isotope dilution analysis, Neutron activation analysis, Radiometric titrations, Numericals, medical applications a) thyroidisis (goitre), b) radioimmunoassay.

Ref.1 Pages 309 to 328, 338 to 345

6. Radiation Safety precautions (04 L)

Safety standards, safe working methods, biological effects of radiations, nuclear waste and its management.

Ref.3 Pages 322 to 328

Aims and objectives:

1. Nuclear Fission:

By studying this topic students are expected to understand

a) Discovery of nuclear fission

b) The process of nuclear fission

c) The charge distribution

d) Fission energy

e) Theory of nuclear fission

2. Nuclear Reactors

The students are expected to know the following from this topic

a) the natural Uranium reactor, The breeder reactor

b) the four factor formula

c) Classification of reactors. d) India's Nuclear Energy programme

3. Nuclear Accelerators:

The student should understand

a) Principle and working of various accelerators

b) What are the electrostatic accelerators?

4. Detection and measurement of nuclear radiations

The aims and objectives are as follows

a) Gaseous ionization and its applications

b) Principle and working of Scintillation Counters , Semiconductor detectors, Neutrondetectors

5. Applications of Radioactivity

The students are expected to know the following from this topic

a) The Probing by isotopes.

b) Typical reactions involved in the preparation of radioisotopes

c) Szilard-Chalmer reaction

d) Analytical applications – Isotope Dilution Analysis, Neutron Activation Analysis, Radiometric Titrations

e) Medical applications such as thyrodisis and radioimmunoassay.

6. Radiation Safety precautions

By studying this topic students are expected to understand

a) Biological effects of radiations, safety standards, safe working methods
b) Reprocessing of the nuclear waste and its management.

References :

1. Essentials of Nuclear Chemistry by H. J. Arnikar, 4th Revised Edition, New Age International Publishers

2. Source book of Atomic energy by Samuel Glasstone, 3rd edition, East -West press.

3. Nuclear Physics by Irving Kaplan, 2nd edition.

4. Introduction to Nuclear physics and chemistry by B.G. Harvey.

5. Fundamentals of Radiochemistry by D. D. Sud, A.V. R. Reddy and N. Ramamoorthy.

Semester- III

Course: Polymer Chemistry (CH-336B)

Topic	No. of lectures
1. Introduction to Polymer Chemistry	04
2. Mechanism and Nomenclature of Polymers	04
3. Chemistry of Polymerization	10
4. Polymerization Techniques	08
5. Polymer Additives	06
6. Molecular Weights of Polymers	05
7.Silicone and Cellulose Polymers	04
8. Polymer Reactions	07
Total Lectures	**48**

1. Introduction to Polymer Chemistry (04 L)

Brief History, Polymer definition, Preparation, Classification, Structures, Chemical bonding & Molecular forces in Polymers.

Ref. 1: Pages 1-14

Ref. 2: Pages 1-16

Ref. 3: Pages 1-12

Ref. 4: Pages 1-17

Ref. 7: Relevant Pages

Ref. 9: Pages 1-8

2. Mechanism and Nomenclature of Polymers (04 L)

a) Polymerization Mechanism, b) Nomenclature of Polymers-i) Common/Trivial names ii) Source-Based names, iii) Structure-Based names (Non IUPAC), iv) IUPAC Structure-based and Linkage-based nomenclature system and v) Trade names / Brand names & Abbreviations

Ref. 4: Pages 11-25 **Ref. 12: Pages 6-17**

3. Chemistry of Polymerization (10 L)

a) Introduction, b) Chain Polymerization: Free radical Polymerization, Ionic polymerization, Co-ordination polymerization- Ziegler-Natta catalyst c) Step Polymerization: Polycondensation, Polyaddition polymerization, and Ring Opening polymerization.

Ref. 1: Pages 15-64

Ref. 2: Pages 25-32, 49-56, 82-86, 88-89, 91-94

Ref. 3: Relevant Pages

Ref. 4: Relevant Pages

Ref. 6: Relevant Pages

Ref. 9: Pages 22-63

4. Polymerisation Techniques (08 L)

Bulk polymerisation, Solution polymerization, Suspension polymerization, Emulsion polymerization, Melt polycondensation, Solution Polycondensation, Interfacial condensation, electrochemical polymerisation, Salient features of different polymerization techniques

Ref. 1: Pages 71-79, 82-84

Ref. 2: Pages 126-132

Ref. 4: Pages 309-324

Ref. 12: Pages 335-341, 173-175

5. Polymer Additives (06 L)

Fillers & Reinforcement, Plasticizers, Antioxidants & Thermal Stabilizers (Heat Stabilizers), Ultraviolet stabilizers, Fire retardants, Colourants, Antistatic agents & Curing agents.

Ref. 3: Pages 170-176

Ref. 4: Pages 502-512, 528-538

Ref. 10: Relevant Pages

6. Molecular Weights of Polymers (05 L)

a) Average Molecular weight, Number Average & Weight Average Molecular weight, Molecular weight & degree of polymerisation, Practical significance of polymer molecular weights, b) Molecular weight determination by End Group Analysis & Viscosity method and c) Problems based on Number Average & Weight Average Molecular weight

Ref. 1: Pages 86-89, 92, 96-98, 402-409

Ref. 2&4: Relevant Pages

7. Silicone and Cellulose Polymers (04 L)

a) Introduction, Synthesis, Reactions, Uses of Silicone polymers, b) Cellulose & Derivatives of cellulose: Rayon, Cellophane, Cellulose nitrate, Cellulose acetate and their uses.

Ref. 1: Pages 255-261

Ref. 5: Pages 143-155

8. Polymer Reactions (07 L)

Introduction, Hydrolysis, Hydrogenation, Addition and Substitution reactions, Cross-linking reactions, Cure reactions, Reactions of various aliphatic and aromatic pendent groups in polymers.

Ref. 1: Pages 291-297, 306-308, 311-321, Ref. 3: Relevant Pages, Ref. 4: 545-555

Aims and Objectives:

The students are expected to learn the following aspects of Polymer Chemistry

1) History of polymers.
2) Difference between simple compounds and polymer.
3) Names of polymers.
4) Various methods of nomenclature.
5) Difference between natural synthetic, organic and inorganic polymers.
6) Terms-Monomer, Polymer, Polymerization, Degree of polymerization, Functionality, Number average, Weight average molecular weight.
7) Mechanisms of polymerization.
8) Polymerization techniques.
9) Importance of silicone polymers.
10) Derivatives of cellulose polymers & their applications.
11) Ingredients added to polymers.
12) What are fillers.
13) Polymer reactions and applications.
14) Polymer reactions and their effect on physical and chemical properties.
15) Advantages of polymer reactions to change their properties.

Reference Books:

1. Polymer Science by V.R. Gowarikar, N.V.Vishvanathan, JaydevShreedhar New Age International Ltd. Publisher 1996.(Reprint 2012)

2. Textbook of Polymer Science by Fred Billmeyer, 3rdEdn. A Wiely-Interscience Publication John Wiely& Sons New York 1984. (Reprint 2008)

3. Introductory Polymer Chemistry by G.S.Misra New Age International (P) Ltd. Publisher 1996.

4. Polymer Chemistry by Charles E. Carraher (Jr.), 6thEdn, (First Indian Print 2005), New York-Basel.

5. Inorganic Polymers by G.R.Chatwal Himalaya Publishing House 1st Edn.1996

6. Polymer Science – A Text Book by V.K. Ahluwalia, Anuradha Mishra.

7. Principle of Polymer Science by P. Bahadur, N.V. Sastry, 2ndEdn, Narosa Publishing House.

8. Polymer Chemistry by Ayodhya Singh, 2008, Published by Campus Book International, New Delhi.

9. Organic Polymer Chemistry by Jagdamba Singh, R.C. Dubey, 4thEdn, 2012.

10. Advanced Polymer Chemistry by V.K. Selvaraj, 1stEdn, 2008, Published by Campus International, New Delhi.

11. Organic Polymer Chemistry by V. Jain, IVY Publishing House, New Delhi.

12. Principles of Polymerisation by George Odian3rdEdn. John Wiely& Sons New York.

Semester- IV

Course: Polymer Chemistry (CH-346B)

Topic	No. of lectures
1. Polymer Degradation	03
2. Chemical and Geometrical structures of Polymer Molecules	04
3. Glass Transition Temperature and Heat Distortion Temperature (Softening Point)	05
4. Crystallinity in polymers	04
5. Some Important Polymers	08
6. Analysis and testing of polymers	06
7. Some Special Polymers	06
8. Polymer Processing	12
Total Lectures	**48**

1. Polymer Degradation (03 L)

Introduction, Types of Degradation, Thermal degradation, Mechanical degradation, Photo degradation.

Ref. 1: Pages 262 – 277 Ref. 3: Pages 151-160

Ref. 4: Relevant Pages Ref. 11: Pages 60-65

2. Chemical and Geometrical structures of Polymer Molecules (04 L)

a) Microstructures based on chemical structures-Organic & Inorganic polymers, Homochain&Heterochain polymers, Homopolymers& Copolymers, b) Microstructures based on geometrical structures-Interpenetrating coils, Folded chain, Helical chain, Linear, Branched, Random, Alternating, Graft and Block polymers and c) Stereo-regular polymers-Optical and Geometric Isomerism.

Ref 1: Pages 136-149 Ref 4: Relevant Pages

3. Glass Transition Temperature (GTT) and Heat Distortion Temperature(Softening Point)**(05 L)**

Definition, Factors influencing the Glass transition temperature, Glass transition temperature and molecular weight, Glass transition temperature and plasticizers, Glass Transition Temperature and Crystalline melting point (Tm), Importance of Glass transition temperature.

Ref 1: Pages 150, 163-169, 171-172, 219 Ref 4: Relevant pages

Ref 9: Page 113-116 Ref 10: Pages 47-58

4. Crystallinity in polymers (04 L)

Introduction, Degree of Crystallinity, Crystallisability, crystallites, Factors affecting crystallisability, Effect of crystallinity on the properties of polymers.

Ref. 1: Pages 173-177, 180-183, 189-191, Ref. 5: Pages 69-74, Ref. 9: Pages 103-112

5. Some Important Polymers (08 L)

Polystyrene, Polymethylmethacrylate, Polyester, Polycarbonates, Polyamides, Polyvinyl alcohol (PVA), Polyvinyl chloride (PVC), Polytetrafluoroethylene (Teflon) &polyvinyl fluoride, lyisoprene, Polyimide, Phenol formaldehyde resin (Novolac), Urea formaldehyde resin, Epoxy polymers.

Ref. 1: Pages 213-254, **Ref. 3: Relevant Pages**

Ref. 4: Relevant Pages, **Ref. 8: Relevant Pages**

6. Analysis and testing of polymers **(06 L)**

a) Spectroscopic Methods: IR, NMR, b) Thermal analysis: Differential Scanning Calorimeter (DSC), &Thermo Gravimetric Analysis (TGA), c) Physical testing: Mechanical properties, Thermal properties, Optical properties, Electrical properties, Chemical properties.

Ref 2: Pages 229-237, 242-252, **Ref 4: Pages 121-139**

7. Some Special Polymers **(06 L)**

Polymer blends, Bio-medical polymers, Biodegradable polymers, Liquid Crystalline polymers (LC's), Conducting polymers, thermally stable polymers, Optical fibers,

Ref. 4: Relevant Pages, **Ref. 6: Pages 179,185,197**

Ref.7: Pages 262-299, **Ref. 9: Pages 130-162**

8. Polymer Processing **(12 L)**

a) Plastic Technology **(04)**

1) Molding 2) Extrusion 3) Other processing methods: Calendaring, Film Casting, Coating, Foaming, Forming, Laminating & Low pressure molding, Compounding.

Ref. 2: Pages 457-469, 474-475., **Ref. 1, 4, 6, 7, 9: Relevant pages**

b) Fiber Technology **(04)**

1) Introduction, Textile & Fabric properties, 2) Fiber Spinning: i) Melt spinning ii) Dry spinning iii) Wet spinning and 3) Fiber after treatments: Scouring, Lubrications, Sizing, Dyeing, Finishing, Texture yarns, Nonwoven fabrics.

Ref 2: Pages 486-501, **Ref. 1, 4, 6, 7, 9: Relevant pages**

c) Elastomer Technology **(04)**

1) Introduction, Vulcanization (Sulphur& non sulphur vulcanization), 2) Reinforcement, Elastomer Compounding.

Ref. 2: Pages 506-518 , **Ref. 1, 4, 6, 7, 9: Relevant pages**

Aims and Objectives

The students are expected to learn the following aspects of Polymer Chemistry

1) What is polymer degradation?
2) Chemical and geometric structures of polymers.
3) Important polymers like PVC, polystyrene, polyvinyl alcohol, Teflon, Resins, nylon, epoxy polymers, etc.

4) Uses & properties of polymers.
5) Role of polymer industry in the economy.
6) Advantages of polymers.
7) Some industrially important polymers
8) What is polymer processing?
9) Different polymer processing techniques.
10) Polymer testing and analysis.
11) Properties of polymers & testing.
12) Various fiber spinning techniques.
13) Reinforcement & compounding of polymers.

Reference Books:

1. Polymer Science by V.R. Gowarikar, N.V.Vishvanathan, JaydevShreedhar New Age International Ltd. Publisher 1996.(Reprint 2012)
2. Textbook of Polymer Science by Fred Billmeyer, 3rd Edn. A Wiely-Interscience Publication John Wiely& Sons New York 1984. (Reprint 2008)
3. Introductory Polymer Chemistry by G.S.Misra New Age International (P) Ltd. Publisher 1996.
4. Polymer Chemistry by Charles E. Carraher (Jr.), 6th Edn, (First Indian Print 2005), New York-Basel.
5. Inorganic Polymers by G.R.Chatwal Himalaya Publishing House 1st Edn.1996
6. Polymer Science – A Text Book by V.K. Ahluwalia, Anuradha Mishra.
7. Principle of Polymer Science by P. Bahadur, N.V. Sastry, 2nd Edn, Narosa Publishing House.
8. Polymer Chemistry by Ayodhya Singh, 2008, Published by Campus Book International, New Delhi.
9. Organic Polymer Chemistry by Jagdamba Singh, R.C. Dubey, 4th Edn, 2012.
10. Advanced Polymer Chemistry by V.K. Selvaraj, 1st Edn, 2008, Published by Campus International, New Delhi.
11. Organic Polymer Chemistry by V. Jain, IVY Publishing House, New Delhi.
12. Principles of Polymerisation by George Odian3rd Edn. John Wiely& Sons New YorkYork.

Semester- III

Course: Introduction To Biochemistry And Molecular Biology (CH-336C)

Name of the Topic	Number of lectures
1. Amino acids and Proteins	11
2. Carbohydrates	06
3. Lipids	06
4. Hormones	03
5. Enzymes	07
6. Vitamins and Coenzymes	04
7. Cell Biochemistry	05
8. Biochemical techniques	06
Total lectures	**48**

1. Amino acids and proteins: (11 L)

Introduction, biological functions, classification-based on structure, function and composition. Structural organization of proteins- primary, secondary, tertiary and quarternary structures (general overview). Factors that stabilize protein structure.Denaturation of Proteins.

Reference: 3, Chapter 4, Amino acids and Proteins, pg 45-71.

1)Foldings and misfoldings of protiens by stepwise process
2) Diseases caused by misfoldings of protiens for ex..Alzhimer,Prions
Reference: 1, Page no 116 to 153

2. Carbohydrates: (06 L)

Introduction of carbohydrates, Introduction and biological significance of proteoglycans, Glycoproteins, Glycolipids, Lectin Carbohydrates- Interaction(Sugar code). Analysis of carbohydrates.

Reference.1: page no. 255 to 268
Reference.2: Page no : 648 to 653 .

3. Lipids: (06 L)

Introduction, Biological significance, Classification-Simple ,compound, steroids and derived lipids. Structure of saturated and unsaturated fatty acids, structure of phospholipids (Phosphatidic acid, Lecithin, Cephalin, Lipositol), structure of Sphingomyelin and Cholesterol.Amphipathic lipids and their behavior in water.Saponification number, Acid number, Iodine number and their significance.Rancidity of lipids. Types of Lipoproteins and their significance, Structural Lipids in membrane glycerophopholipids, Sulphalipids, Galactolipids, glycosphingolipids

Reference.1: page no. 343 to 360
Reference: 3, Chapter 3, Lipids, pg 29-42.

4. Hormones: (03 L)

Definition, classification based on biochemical nature, location and mechanism of action. Concept of second messengers-c.AMP and Calcium inositide system.

Reference: 2, Chapter 42 and 43, pg 434, 462 and 464.

5. Enzymes: (07 L)

Classification- Six major classes of enzymes, Conjugated enzymes- Apoenzyme, Holo enzyme, prosthetic group (coenzymes and cofactors). Features of active site.enzyme specificity, Factors affecting enzyme activity- substrate concentration, pH, temperature, and enzyme concentration, product concentration. MM equation, LB equation (derivation not required) and significance of Km. Enzyme inhibition-competitive, non competitive and uncompetitive with suitable examples.Allosteric enzymes and clinical significance of Isoenzymes.

Reference: 3, Chapter 6, Enzymes, pg 85 – 112.

6. Vitamins and Coenzymes: (04 L)

Classification- Fat soluble and water soluble vitamins (source, biological functions and deficiency disorders), coenzyme forms of vitamin B complex.(Structure not required).

Reference: 2, Chapter 45: pg 481-496

7. Cell Biochemistry: (05 L)

Introduction to Cell, Unicellular and Multicellular organisms, Distinguishing features of Prokaryotic and Eukaryotic cell. Structure and function of Cell membrane, Mitochondria, Endoplasmic reticulum, Golgi complex, Lysosomes, Peroxisomes, Plant cell wall and Chloroplast. Concepts of Biomolecules and types of bonds in biomolecules.

Reference: 5, Chapter 3, Unicellular and multicellular cell, cell membrane, pg 32- 68, Chapter 10, Mitochondria, pg 191- 219, Chapter 6, Endoplasmic Reticulum, pg 154- 165, Chapter 7, Golgi Complex, pg 166- 174, Chapter 8, Lysosomes, pg 175- 183, Chapter 9, Peroxisomes, pg 184-189, Chapter 1, Chloroplast, pg 220- 240.

8. Biochemical techniques. (06 L)

Principle, working and applications of dialysis, Paper chromatography, Thin layer chromatography, Column chromatography- Gel filtration, Ion exchange, Affinity Chromatography. Electrophoresis- Paper and Gel (Agarose, Native and SDS- PAGE).

Reference: 6, Chapter 11, pg 524- 546. Chapter 10, pg 449- 473.**2**, Chapter 3, pg 89. 7, pg 344-421,

Aim and Objectives :

I **Cell Biochemistry**: The student needs to understand of Cell types, Difference between a bacterial cell., Plant cell and animal cell. Biological composition and organisation of cell membrane as per Singer and Nicholson model, structure and function of various cell organelles of plant and animal cell. Concepts of biomolecules,Bonds that link monomeric units to form macromolecules.

II.**Carbohydrates,:** The student needs to know the types of carbohydrates and their biochemical significance in living organisms, structure of carbohydrates and reactions of carbohydrates with Glucose as example. Properties of carbohydrates.

III**. Lipids:** The student needs to know the types of lipids with examples, structure of lipids, properties of lipids.

IV. **Aminoacids and proteins:** The student needs to know the structure and types of amino acids. Reactions of amino acids.Properties of aminoacids.Peptide bond formation.Types of proteins.Structural hierarchy in proteins. Features of denaturation of proteins.

V. **Enzymes:** The student needs to know the classes of enzymes with subclasses and examples. Enzyme specificity, Equations of enzyme kinetics Km and its significance, features of various types of enzyme inhibitions.

VI. **Biochemical techniques:** The student needs to know the principle, working procedure and applications of various techniques used in biochemical studies.

VII.**Vitamins and Coenzymes:** The student needs to know the types of vitamins ,their source, biochemical significance and deficiency disorders. Coenzyme forms of Vitamin B complex and their metabolic significance.

VIII. **Hormones**: Basic concepts of Endocrinology.Types of Endocrine glands and their hormones.Biochemical nature of hormones.Role of Second messengers in hormone action.

Reference Books

1. Lehninger's, Principles of Biochemistry, by Nelson and Cox Macmillan Publisher 4thEdn..
2. Harper's Illustrated Biochemistry, 26th Edition.
3. Biochemistry by U. Satyanarayana
4. Biotechnology, B.D.Singh, 3rd edition.
5. Cell biology, Genetics, Molecular Biology, Evolution and Ecology, by Verma and Agarwal, 14th edition.
6. Principle techniques of Biochemistry and Molecular Biology by Keith Wilson and John Walker, 6th edition.
7. Biophysical techniques by Upadhyay and Nath, 3rd revised edition.

Semester- III

Course: Introduction To Biochemistry And Molecular Biology (CH-346C)

Name of the Topic	Number of lectures
1. Introduction to Metabolism	02
2. Carbohydrate metabolism	06
3. Lipid metabolism	04
4. Amino acid metabolism	04
5. Electron Transport Chain and Oxidative Phosphorylation	06
6. Nucleic acids	07
7. DNA replication	06
8. Transcription	05
9. Translation	04
10. Introduction to Genetic engineering	04
Total lectures	**48**

1. Introduction to Metabolism: (02 L)

Definition of catabolism and anabolism, Types of metabolic reactions, High energy compounds, Significance of ATP.

Reference: 3, Chapter 12,Introduction to metabolism , pg 247- 249 and Chapter 11 Biological oxidation pg. 227-230.

2. Carbohydrate metabolism and TCA cycle (06 L)

Aerobic and anaerobic glycolysis- structures of intermediates, various enzymes involved and energetics. Fate of Pyruvate, Pyruvate dehydrogenase complex.TCA cycle- enzymatic reactions and energetics.

Reference: 2, Chapter 17: Glycolysis pp 136-144 and Chapter 16: The Citric Acid Cycle pp. 130-135

3. Lipid metabolism (04 L)

Transportation of fatty acids with the help of carnitine, β-oxidation of palmitic acid in mitochondria and its energetics.Triacylglycerol synthesis, ketogenesis.

Reference:2, Chapter 22, Oxidation of fatty acids: Ketogenesis, pp 180-189.

4. Amino acid metabolism: (04 L)

Significance of transamination, deamination, decarboxylation reactions of amino acids.Urea cycle.

Reference: 2, Chapter 29: Catabolism of Proteins and of amino acid nitrogen. pp 242 - 248

5. Electron Transport Chain and Oxidative Phosphorylation: (06 L)

Location of Electron carriers, Electron transport chain, Proton gradient, Oxidative phosphorylation-Chemiosmotic hypothesis, Inhibitors and Uncouplers of Electron transport chain and Oxidative phosphorylation .

Reference: 3, Chapter 11 Biological oxidation, pg 230-239.

6. Nucleic acids: (07 L)

Structures of Purines and Pyrinmidines, Nucleosides, Nucleotides, Polynucleotides.Difference between DNA and RNA. Watson and Crick model of DNA. DNA as genetic material (Macleod and Mcarty, Hershey and Chase experiments).RNA and its types.Central dogma of molecular biology.

Reference: 3, Chapter 5, Nucleic acids, pg 73-83.

7. DNA replication: (06 L)

Semiconservative model of replication (Messelson and Stahl experiment). Brief account of initiation (features of OriC), elongation and termination of DNA replication in prokaryotes. Okazaki fragments, Leading and Lagging strands, Distinguishing features of DNA polymerase I, II and III. Klenow fragment of DNA polymerase I.

Reference: 1, Chapter 25, DNA metabolism, pg 950 - 984

8. Transcription: (04 L)

Brief account of initiation- Promoter sequences, elongation and termination of transcription in prokaryotes. RNA polymerase. Examples of inhibitors of transcription. Chapter 26: 996- 1027

Reference: 1, Chapter 26, RNA metabolism, pg 948 – 1033.

9. Translation: (05 L)

Genetic code and its features.Brief account of initiation, elongation and termination of translation in prokaryotes.Examples of inhibitors of translation.Regulation of gene expression- Lac operon.

Reference: 1, Chapter 27, Protein metabolism, pg 1034- 1075.

10. Introduction to genetic engineering: (04 L)

Basic concepts of genetic engineering - Restriction Enzymes- Types and features, Vectors (Plasmids,Phages and Cosmids) , Recombinant or Chimeric vector. Principle and Steps involved in gene cloning with insulin as example. Applications of genetic engineering in various fields.

Reference: 1, Chapter 9, pg 307- 310, pg 311-313(vectors), **4**, Chapter 2, pg 15.

Aim and Objectives

a. Metabolism, Carbohydrate, Lipid and Amino acid metabolism: The student needs to know the significance of metabolism and energetics. Role of ATP and types of other high energy compounds.Individual reactions of the metabolic pathways, various enzymes and coenzymes, energetic and features of the pathway.

b. **Electron Transport Chain and Oxidative Phosphorylation**: The student needs to know the concepts of biological oxidation. Types of electron carriers and their location in mitochondria.Formation of proton gradient, Proton motive force and Oxidative phosporylation, formation of ATP in the oxysomes. Inhibitors and Uncouplersof Mitochondrial ETC.

c. **Nucleic acids:** Understanding the structures of purines, pyrimidines, nucleosides and nucleotides , structural features of nucleic acid types and their role. Central dogma of molecular biology. Experimental procedures that prove DNA as genetic material and its interpretations.

d. **Replication:** The student needs to know the experiment that showed the salient features of semi conservative DNA replication, stepwise events involved in replication of DNA.

e. **Transcription:** The student needs to know stepwise events of transcription of RNA and list of inhibitors of transcription.

f. **Translation**: The student needs to know the stepwise events of translation of proteins and its significance. List of inhibitors of translation.Features of regulation of gene expression with lac operon studies.

e. **Introduction to genetic engineering:** The student needs to know the overview of the steps involved in insulin gene cloning, and applications of genetic engineering in various fields like agriculture, industries and medicine.

Reference Books

1. Lehninger's, Principles of Biochemistry, by Nelson and Cox Macmillan Publisher 4thEdn..
2. Harper's Illustrated Biochemistry, 26th Edition.
3. Biochemistry by U. Satyanarayana
4. Biotechnology, B.D.Singh, 3rd edition.
5. Cell biology, Genetics, Molecular Biology, Evolution and Ecology, by Verma and Agarwal, 14th edition.
6. Principle techniques of Biochemistry and Molecular Biology by Keith Wilson and John Walker, 6th edition.
7. Biophysical techniques by Upadhyay and Nath, 3rd revised edition.

Semester-III

Course: Environmental and Green Chemistry (CH-336D)

Name of the Topic	Number of lectures
1. Concepts and scope of Environmental Chemistry	02
2. Atmosphere and Air Pollution	14
3. Hydrosphere and water pollution	08
4. Introduction to Green Chemistry	10
5. Green Chemistry and Technology for sustainable development	10
6. Green Chemistry and Hazardous Organic Solvents	04
Total lectures	**48**

Chapter 1: Concepts and scope of Environmental Chemistry **(02)**

1.1 Introduction
1.2 Terminologies
1.3 Units of concentration
1.4 Segments of Environment
Ref. 1, Ref. 3

Aims and Objectives-
Students should know-
i. Importance and conservation of environment.

Chapter 2: Atmosphere and Air Pollution **(14)**

2.1 Composition and structure of atmosphere
2.2 Chemical and photochemical reactions in atmosphere
2.3 Chemistry of O_3, SOx, NOx and chlorides in atmosphere
2.4 Primary air pollutants
2.5 Sampling of air
2.6 Particulate matter: inorganic and organic
2.7 Smog: reducing and photochemical
2.8 Mechanism of ozone depletion
2.9 Stability and reactions of CFCs
2.10 Harmful effects of CFCs
2.11 CFCs substitutes
2.12 Bhopal gas tragedy
Ref. 1, Ref. 3, Ref. 5

Aims and Objectives-
Students should know-
i. Segments of atmosphere

ii. Hazards of flue gases
iii. Ozone depletion
iv. Ecological changes due to hazardous gases
v. Understand the social issues

Chapter 3: Hydrosphere and water pollution **(08)**

3.1 Water resources
3.2 Physical chemistry of sea water: composition, equilibria, pH, pE
3.3 Microbially mediated aquatic reactions, nitrogen cycle, iron and manganese bacteria
3.4 Classification of water pollutants
3.5 Organic and Inorganic pollutants: Pesticides, Detergents, Eutrophication, Marine, Oil, Acid mine drainage, remedial measures and sediments
3.6 Thermal pollution
3.7 Sampling and monitoring water quality parameters: pH, D.O. (Winkler Method), COD, TOC, Total hardness, free chlorine.
Ref. 1, 2, 3, and 5

Aims and Objectives-
Students should know-
i. Water resources
ii. Quality of potable water
iii. WHO limits for toxic materials in water stream
iv. Quality measures

Chapter4. Introduction to Green Chemistry **[10]**

4.1 Chemistry is good
4.2 The environment and the five environmental spheres
4.3 What is environmental Chemistry?
4.4 Environmental Pollution
4.5 What is green Chemistry?
4.6 Green Chemistry and synthetic chemistry
4.7 Reduction of risk: Hazard and exposure
4.8 The risk and no risks
4.9 Waste prevention
4.10 Basic principles of green chemistry
4.11 Examples based on green technology
[Ref: Green Chemistry By Stanley E Manahan, Chemchar Research Inc. (2006) -2nd Edn. chapter 1, P1-17 and Ref.6 Relevant pages.]

Chapter 5. Green Chemistry and Technology for sustainable development **[10]**

5.1 Green Chemistry from theory to practice
5.2 The twelve principles of green chemistry
5.3 Green Chemistry and sustainable Development
5.4 Designing Products under the holistic approach " Cardle-to Cardle"
5.5 Scientific areas for practical applications of green chemistry
5.6 Use of alternative basic chemicals as feedstocs in chemical industry and research

5.7 Green Chemistry and Reduction of solvent Toxicity (Alternative Solvents or replacement)
5.8 Applications of New Methodologies in the synthesis of chemical compounds- catalysis and green chemistry.

[Ref : Green Chemistry–Green engineering by AthanasiosValavanidis and ThomaisVlachogianni (March 2012) ; Chapter 2 p17-37 and Ref.6 Relevant pages]

Chapter 6. Green Chemistry and Hazardous Organic Solvents (Green solvents, replacement and Alternative techniques) [04]

6.1 Introduction to Green Chemistry and Toxic organic solvents
6.2 Green solvents and Alternative methods
6.3 Green Chemistry, Green solvents – Alternative techniques in organic synthesis
[Ref : Green Chemistry –Green engineering , Chapter 5, p81-91, Ref.6 Relevant pages]

Aims and Objectives-(for Chapters 4, 5 and 6)

Students should know-

i. Need of green chemistry technology
ii. Principles of green chemistry
iii. Advantages of green chemistry
iv. Simple examples to clarify the principles
v. Catalytic routes for sustainable developments

Reference Books:

1: Environmental Chemistry – A. K. De, 5th Edition (New age international publishers)
2: Environmental Chemistry – J. W. Moore and E. A. Moore (Academic Press, New York)
3: Environmental Chemistry – A. K. Bhagi and C. R. Chatwal (Himalaya Publishing House)
4: Analytical Chemistry – G. D. Christian 4th Edition (John Wiley and Sons)
5: Environmental Chemistry – H. Kaur 2nd Edition 2007, PragatiPrakashan, Meerut, India
6. Environmental Chemistry with Green Chemistry A. K Das , Books and Allied (P) Ltd, and

Semester-III
Course: Environmental and Green Chemistry (CH-346D)

Name of the Topic	Number of lectures
1.Water treatment and effluent management	08
2.Soil and solid waste management	04
3. Instrumental methods in environmental analysis	08
4. Green House Effect and Global Warming	04
5. Water the ultimate Green solvent	12
6. Energy Relations	12
Total lectures	**48**

Chapter 1: Water treatment and effluent management **[08]**

1.1 Domestic sewage, waste water treatment: primary, secondary and tertiary treatments, aerobic, anaerobic and upflow anaerobic sludge bed treatment processes

1.2 Industrial waste water treatment i) filtration method ii) ion-exchange method iii) membrane techniques: ultrafiltration, reverse osmosis and electrodialysis

1.3 Treatment of drinking water

Aims and Objectives-

Students should know-

i. Methods of water purification
ii. Waste water treatment process
iii. Waste water treatment plants

Chapter 2: Soil and solid waste management **[04]**

2.1 Composition of soil and types of soil.

2.2 Organic and inorganic components of soil

2.3 Acid base and ion exchange reactions in soil and pH of soil

2.4 Chemistry of disposal of solid waste i) sanitary landfills ii) incinerators iii) pyrolysis

Ref.1, Ref. 2, Ref. 3

Aims and Objectives-

Students should know-

i. Types of soil
ii. Components of soil
iii. Types of solid waste and their disposal

Chapter 3: Instrumental methods in environmental analysis **[08]**

3.1 Atomic absorption spectroscopy: determination of Hg, As, Zn, Ag, Pb, Mn, Fe, Cu, Cr, Cd

3.2 Gas chromatography: detection and determination of CO, HC and pesticides

3.3 HPLC: determination of pesticides, PAH as metabolites

3.4 Spectrophotometry: determination of NOx, SO_2, NH_3, CN, PO_4, Cd, Pb, Hg

3.5 Chemiluminescence: determination of NOx and O_3.

3.6 Non Dispersive IR spectrometry of determination of CO
3.7 Ion selective electrodes: determination of NO_3 and dissolved oxygen (D. O.)
[Ref. 1, Ref. 2]

Aims and Objectives-
Students should know-
i. Techniques used to monitor hazardous materials present in environment

Chapter 4: Green House Effect and Global Warming **[04]**
4.1 Introduction
4.2 Greenhouse gases
4.3 Radiative forcing
4.4 Sources and sinks of CO_2
4.5 Causes of fluctuations in global temperature
4.6 Global warming and climate changes
4.7 Implications of climate changes
[Ref. 5]

Aims and Objectives-
Students should know-
i. Green house gases and their effects
ii. Global warming
iii. Climate change

Chapter 5. Water the ultimate Green solvent **[12]**
5.1 H_2O : Simple formula and complex molecule
5.2 Important properties of water
5.3 The hydrologic cycle
5.4 Bodies of water and life in water
5.5 Chemical process in water
5.6 Fizzy water from underground
5.7 Oxygen in water
5.8 Weak acid from sky
5.9 Why natural water contains alkalinity and calcium
5.10 Metals in water
5.11 Water interactions with other phases
[Ref: Green Chemistry By Stanley E Manahan, Chemchar Research Inc. (2006)-2nd Edn Chapter 7 : P 161-173]

Aims and Objectives-
Students should know-
i. What do you mean by green solvent
ii. Resources of of green solvents like alcohol and water
iii. Importance of water as a green solvent

Chapter6 .Energy Relations : **[12]**
6.1 Energy

6.2 Radiant Energy from the sun
6.3 Storage and release of energy by chemicals
6.4 Energy sources
6.5 Conversions between forms of energy
6.6 Green engineering and energy conversion efficiency
6.7 Conversion of chemical energy
6.8 Renewable energy sources

[Ref: Green Chemistry By Stanley E Manahan, Chemchar Research Inc. (2006) -2nd Edn Chapter 6 : P 135-157]

Aims and Objectives-

Students should know-

i. Natural resources of energy
ii. Conventional and nonconventional energy resources
iii. Conservation of energy
iv. Utilization of solar and wind energies.

Reference Books:

1: Environmental Chemistry – A. K. De, 5th Edition (New age international publishers)
2: Environmental Chemistry – J. W. Moore and E. A. Moore (Academic Press, New York)
3: Environmental Chemistry – A. K. Bhagi and C. R. Chatwal (Himalaya Publishing House)
4: Analytical Chemisry – G. D. Christian 4th Edition (John Wiley and Sons)
5: Environmental Chemistry – H. Kaur 2nd Edition 2007, PragatiPrakashan, Meerut, India
6. Environmental Chemistry with Green Chemistry A. K Das , Books and Allied (P) Ltd.

Semester-III

Course: Agriculture Chemistry (CH-336E)

Name of the Topic	Number of lectures
1. Soil Chemistry	10
2. Problematic Soil and Soil testing	10
3. Quality of Irrigation Water	08
4. Plant Nutrients	08
5. Fertilizers and Manures	06
6. Protection of Plants	06
Total lectures	**48**

Chapter I –Soil Chemistry (10 L)

1.1 Role of agriculture chemistry
1.2 Scope and importance of agricultural chemistry
1.3 Agricultural chemistry and other science
1.4 Definition of soil, Soil components-mineral component, organic matter or humus, soil atmosphere, soil water, soil microorganism
1.5 Physical properties of soil- soil texture, soil structure, soil color, soil temp, soil density, porosity of soil.
1.6 Surface soil and sub-soil
1.7 Chemical properties of soil, soil reactions and solutions
1.8 Factor controlling soil reaction, buffering capacity, importance of buffer action in agriculture, ion exchange
Ref 1- Pagers 8-12, 92-94, 98-113, 116-146
Ref 3- Pages 28-50

Chapter II – Problematic Soil and Soil testing (10 L)

2.1 Acid soil- formation of acid soil, effect of soil acidity of soil, reclamation of acidic soil
2.2 Alkali Soil- formation of alkali soil, reclamation of alkali soil
2.3 Classification of alkali soil- saline soil, saline alkali soil, non-saline alkali soil
2.4 Calcareous soils
2.5 Introduction to soil testing
2.6 Objectives of soil testing
2.7 Phases of soil testing- collection of soil sample, analysis in the laboratory and fertilizer applications
Ref 1- 345-370, Ref 3- 301-312, Ref 4- 135-147 and 150-159

Chapter III- Quality of Irrigation Water (08 L)

3.1 Sources of Water- Atmospheric water, Surface Water, Stored Water, Ground Water
3.2 Impurities in Water, Water quality, related problems in public health, environment and agriculture

3.3 Analysis of irrigation Water (ppm, meq/lit.epm)
3.4 Dissolved constituents and their functions
Major constituents- Ca, Mg, Na, K, Carbonate, bicarbonate, sulfate, Chloride and nitrate
Minor constituents- B, Si, nitrite, Sulfide and fluoride
3.5 Water quality standard- total soluble salt (TSS), sodium adsorption ratio (SAR), Exchangeable sodium percentage (ESP), Residual sodium carbonate, salinity classes for irrigation water
Ref 8- Pages 293-309

Chapter IV- Plant Nutrients (08 L)
4.1 Need of plant nutrients, forms of nutrients updates, nutrient absorption by plants
4.2 Classification of essential nutrients
4.2.1 Primary nutrients (N, P, K), its role and deficiency symptoms in plants
4.2.2 Secondary nutrients, (Ca, Mg, S), its role and deficiency symptoms in plants
4.2.3 Micronutrients, General functions of micronutrients (Zn, Fe, Mn, Cu, B, Mo, Cl)
4.3 Effect of environmental condition, nutrient uptake
Ref 3- Pages 207-241, Ref 4- Pages 176-195, Ref 7- pages 287-300

Chapter V- Fertilizers and Manures (06 L)
Fertilizers
5.1 Introduction, Classification & application of fertilizers
5.2 Time and methods of fertilizers
5.3 Factors affecting efficiency of fertilizers
5.4 Vermicompost preparation, effect of vermicompost on soil fertility
5.5 Synthetic fertilizers definition, comparison of synthetic fertilizers with organic fertilizers , environmental effect of synthetic fertilizers
Manures
5.6 Introduction, Definition and classification of manures
5.7 Effect of bulky organic manures on soil, farm yard manures (FYM), Factors affecting on FYM, method of preparation, losses during handling and storage
5.8 Biogas plant. Human waste, sewage and sludge, types of sludge, carbon nitrogen ratio, sewage irrigation and uses
5.9 Green manuring, types of green manuring, characteristics, advantages and disadvantages of green manuring
6.0 Biofertlizers: definition, classification, role & advantages

Ref 2- Pages 205-213, Ref 3- 90-112, 137-149

Chapter VII- Protection of Plants (06 L)
Pesticide Classification and mode of action
7.1 Insecticide- Definition, Classification, chemical properties, elemental composition, mode of action of synthetic and plant originated compounds organophosphates, malathion, parathion, carbamates
7.2 Fungicides- Definition, Classification, Chemical properties, mode of action of S

& Cu fungicides
7.3 Herbicides- Definition,, Classification, composition, mode of action of Selective and non-selective herbicides.

Ref 6- Relevant Pages

Learning Objectives of Agriculture Chemistry

After studying this course, student is expected to
1. Know the role of agriculture chemistry and its potential
2. Understand basic concept of soil, properties of soil & its classification on the basis of pH
3. Know the different plant nutrients, Their functions and deficiency symptoms
4. Understand importance of manures as compared to chemical fertilizers'
5. Understand the importance of green manuring
6. Have the knowledge of the use of proper the plants
7. Know various techniques to protect the plants
8. Have the knowledge of various pesticides, insecticides, fungicides and herbicides
9. Identify the problematic soil and recommend method for their reclamation
10. Have the knowledge of quality irrigation water, water quality standard and analysis of irrigation water

Reference Books

1. A text book of soil science (Recise Ed) J.A. Daji, Revised by J.R. Adam, N.D. Patil, Media promoters and publishers, Mumabi, 1996
2. Text book of soil science, T.D. Biswas, S.K. Mukharjee, Tata McGraw Hill Publishing company, New Delhi
3. Introduction to Agronomy and soil, water management, V.G. Vaidya, K.R. Sahashtra Buddhe (Continental Prakashan)
4. Principals of soil science, M.M. Rai, Millian complex of India, Bombay, 1977
5. Manures and fertilizers (sixth ed), K.S. Yawalkar, J.P. Agarwal and Bokde, Agrihorticulture publishing house, Nagpur, India
6. Chemistry of insecticides and fungicides, U.S. Sreeramula (2nd Ed), oxford and IBH Publishing company, New Delhi
7.Fundamentals of soil sciences, C.E. Millar and L.M. Turk, Bio-Tech- New Delhi (1st Ed 2001)
8. Soil, Plant, Water and fertilizer analysis, P.K. Gupta, Published by Agro Botanica
9. **Biofertilizers** and biopesticides , Author: Deshmukh, A. M. (ArvindMadhavrao),

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Semester-IV

Course: Dairy Chemistry (CH-336E)

Name of the Topic	Number of lectures
1. Market Milk	08
2. Common Dairy Processes	06
3. Special Milks	08
4. Milk proteins, Carbohydrates and Vitamins	08
5. Preservatives & Adulterants in Milk	06
6. Milk Products	08
7. Dried Milk Products	04
Total lectures	**48**

Chapter I – Market Milk (08 L)

Introduction, Definition, constituents of milk of different species such as cow, buffalo, goat, etc., Chemical composition of milk of Indian breed and foreign breeds of cow, factor affecting composition of milk, characteristics of milk of different mammals, physicochemical properties of milk, acidity, pH, density, specific gravity, color and flavor of milk, food and nutritive value of milk. Microbiology of milk, growth of microorganism, stages of growth, product of microbial growth, destruction of microorganisms growth.

Ref 1 chap I relevant pages, Ref 2 pages 9-26, Ref 6 – relevant pages.

Chapter II – Common Dairy Processes (06 L)
(Manufacture, storage and packaging)

Cream separation- Basic principles, gravity creaming water dilution and centrifugal creaming method, construction of centrifugal separator, factors affecting percentage of fat, speed of machine, temp. of milk, rate of inflow amount of flushing water formation of separator slime Pasteurization of milk, flow sheet diagram, process receiving milk, preheating filtration, clarification, cooling and storage raw milk, standardization, pasteurization, homogenization, packing and storage, uses of milk.

Ref 1.- Relevant pages.

Chapter- III Special Milks (08 L)

1. Sterilized milk- Definition, method of manufacture in detail, Advantages and disadvantages. 2. Homogenized milk,- Definition, merits and demerits factor influencing homogenization, Process of manufacture. 3. Soft curd milk- Definition, characteristics, method of preparation of soft curd milk. 4. Flavored milk- Definition, types, method of manufacture flow sheet diagram. 5. Vitaminised / irradiated milk- - Definition, method of manufacture. 6. Fermented milk-Definition, method of manufacture. 7. Standardized milk- Definition, method of manufacture.

Ref 1 Chap II relevant pages.

Chapter IV- Milk proteins, Carbohydrates and Vitamins (08 L)

1. Milk proteins- importance of proteins found in the milk-casein, albumin and globulin, composition, nomenclature, properties and uses. 2. Carbohydrates- importance of lactose, classification, properties, nutritive value of lactose use of lactose. 3. Vitamins- importance, definition,

properties nutritive value of vitamins, Vit-A, Vit-B, B2, B6, B12, Vit-C (Ascorbic acid) & Vitamin-D. 4. Food and nutritive value of milk, milk & public health.

Ref-2 Pages 11,12,33 to 38, 42 to 49, 51 to 53

Chapter V- Preservatives & Adulterants in Milk (06 L)

1. Preservation of milk- Introduction, Common preservatives are used. 2. Adulterants- Introduction, Modes of Adulteration and their detection such as skimming, addition of separated milk, skim milk, Water, Starch and cane sugar.

Ref -2 Pages 78-81

Chapter VI- Milk Products (08 L)

Cream, Butter, Cheese and Ice-Cream.

1. Cream- Definition, Classification, Composition, Food & Nutritive value, Physicochemical properties, Manufacture and uses of cream. Ref-1 117, 118, 121 & 142

2. Butter- Definition, Classification, Composition, Food & nutritive value, Physicochemical properties, Manufacture and uses of Butter selection of milk/cream. Preheating of milk, Separating of milk, neutralization of cream, Pasteurization of cream, Cooking & ageing, repending of cream, salting of butter, washing of butter, packaging & Storage, use of butter.

Ref -1 Pages 143, 144, 145 to 158 & 173

3. Cheese- Definition, Classification, Food & nutritive value, properties, Manufacture and uses of cheese.

Ref -1 Pages 224, 227, 229 to 242 & 267

4. Ice-cream- Definition, Classification, Composition, Food & Nutritive value, Manufacture, packing, hardening & Storage, uses of Ice-cream.

Ref -1 Pages 182, 183, 184, 193,223

Chapter VII- Dried Milk Products (04 L)

Introduction, butter milk powder, whey powder, cream powder, infact milk powder, Shrikand powder, Ice-cream mix powder, cheese powder.

Ref-1 Pages 357 to377

Learning Objectives-

The students are expected to study “Dairy Chemistry” in view of-

1. Knowing importance of the subject from the point of rural economy.
2. Knowing the composition of milk, its food & nutritive value
3. Understanding the Microbiology of the milk
4. Understanding various preservation and adulterants, various milk proteins and their role for the human body.
5. Knowing various milk products, their composition, manufacture and uses.

References-

Ref- 1: Qutline of Dairy Technology- Oxfored University press By- Sukumar De. (Edition-1983)

Ref- 2: Dairy Chemistry and Animal Nutrition- M.M. Rai, Kalyani, Publishers, New Delhi 3rd Edition, 1980
Ref- 3: Fundamentals of Dairy Chemistry- B.H. Webb, A.H. Hohsson, J.A. Alford, CBB Publishers and Distributors.
Ref- 4: Milk and Milk Products- C.H. Eckles, H. Macy, Tata McGraw Hikk Publishing Company Ltd.
Ref- 5: Chemistry and Testing of Dairy Products- H.V. Athertion, J.A. New Lander, CBS, Publishers and Distributors.
Ref-6: Dairy Microbiology, Dr. K.C. MahantaOmsons Publication New Delhi.

SAVITRIBAI PHULE PUNE UNIVERSITY, PUNE

Revised Structure of Syllabus for B.A. Geography to be Effective From

F.Y.B.A. – June, 2013
S.Y.B.A. – June, 2014
T.Y.B.A. – June, 2015

F.Y.B.A.	
G-1	**Gg-110 Elements of Geomorphology**

S.Y.B.A.	
G-2	**Gg-210 Elements of Climatology and Oceanography**
	OR
G-2	**Gg-210 Geography of Disaster Management**
S-1	**Gg-220 Economic Geography**
	OR
S-1	**Gg-220 Tourism Geography**
S-2	**Gg-201 Fundamentals of Geographical Analysis**

T.Y.B.A.	
G-3	**Gg-310 Regional Geography of India**
	OR
G-3	**Gg-310 Human Geography**
S-3	**Gg-320 Agricultural Geography**
	OR
S-3	**Gg-320 Population and Settlement Geography**
S-4	**Gg-301 Techniques of Spatial Analysis**

Equivalence of Syllabus in Geography (S.Y.B.A.)
Effective From June 2014

Old Syllabus (June 2009)		New Syllabus (June 2014)		Equivalent (Yes / No)
Gg-210	Geography of Human Resources	Gg-210	Elements of Climatology and Oceanography	No
Gg-210	Geography of Natural Hazards	Gg-210	Geography of Disaster Management	Yes
Gg-220	India: A Geographical Analysis	Gg-220	Economic Geography	No
Gg-220	China: A Geographical Analysis	Gg-220	Tourism Geography	No
Gg-201	Fundamentals of Geographical Analysis	Gg-201	Fundamentals of Geographical Analysis	Yes

Equivalence of Syllabus in Geography (T.Y.B.A.)
Effective From June 2015

Old Syllabus (June 2010)		New Syllabus (June 2015)		Equivalent (Yes / No)
Gg-310 (G3)	Geography of Tropical Agriculture	Gg-310	Regional Geography of India	No
Gg-310 (G3)	Geography of Travel and Tourism	Gg-310	Human Geography	No
Gg-320 (S3)	Fundamental Concepts in Geography	Gg-320	Agricultural Geography	No
Gg-320 (S3)	Contemporary Issues and Geography	Gg-320	Population and Settlement Geography	No
Gg-301 (S4)	Techniques of Spatial Analysis	Gg-301	Techniques of Spatial Analysis	Yes

Structure /Pattern of Syllabus- T.Y.B.A

1. Title of the Course – **Gg.-310: Regional Geography of India (G-3)**

2. Preamble of the Syllabus

i. To understand the physical characteristics of India

ii. To understand the cultural characteristics of India

iii. To sensitize the students with development issues and policies and programmes designed for regional development.

3. Introduction: Pattern –**Annual (20 marks internal, 80 marks University)**

4. Eligibility- **S.Y.B.A. with Geography General at S.Y. B. A.**

5. Examination-

A. Pattern of examination

i. Internal Term -End and University Exam.

ii. Pattern of Question Paper- 20 : 80

Internal Exam- 60 Marks = (Converted in to 20 Marks)

University Exam- 80 Marks

B. Standard of passing- **Internal 08- University 32= Annual Marks 40**

C. All Courses of F. Y. B. A. must be cleared

D. A.T.K.T.Rules- Yes

E. Award of class- **S.Y.B.A. Pass**

F. External students- **S.Y.B.A. Pass with Geography General at S.Y. B. A.**

G. Setting of Question Papers / Pattern of Question Paper

Internal Exam- 60 Marks = (Converted into 20 Marks)

Question 1. Answer in 20 words- 14marks (any 7 out of 10)
Question 2. Answer in 50 words -08 marks (any 2 out of 4)
Question 3. Answer in 150 words- 18 marks (any 3 out of 5)
Question 4. Answer in 300 words- 20 marks (any 1 out of 2)

University Exam- 80 Marks =

Question 1. Answer in 20 words- 20 marks (any 10 out of 15)
Question 2. Answer in 50 words -10 marks (any 2 out of 4)
Question 3. Answer in 150 words- 20 marks (any 2 out of 4)
Question 4. Answer in 300 words- 30 marks (any 2 out of 4)

G. Verification / Revaluation- **Yes**

6. Structure of the Course

a. Compulsory paper- **T.Y.B.A. General**

b. Optional paper- **Yes**

c. Question Paper and Papers etc. - **One**

d. Medium of Instructions- **Marathi and English**

7. Equivalence of Previous Syllabus along with Propose Syllabus- **Yes**

8. University Terms- **Annual**

9. Subject wise Detail Syllabus – **As per attached Sheets**

10. Recommended Books- **Mentioned in Syllabus**

Qualification of Teacher-**M.A./M.Sc. (Geography), as per UGC and University norms**

Structure /Pattern of Syllabus- T.Y.B.A

1. Title of the course – **Gg.:310- Human Geography (G-3)**

2. Preamble of the Syllabus

i. The objectives of this course are to acquaint the students with the nature of man-environment relationship and human capability to adopt and modify the environment under its variedconditions from primitive life style to the modern living.

ii. To identify and understand environment and population in terms of their quality and spatial distribution pattern and to comprehend the contemporary issues facing the global community.

3. Introduction: Pattern –**Annual (20 marks internal, 80 marks University)**

4. Eligibility- **S.Y.B.A. with Geography General at S.Y. B. A.**

5. Examination-

A. Pattern of examination

i. Internal Term -End and University Exam.

ii. Pattern of Question Paper- 20 : 80

Internal Exam- 60 Marks = (Converted in to 20 Marks)

University Exam- 80 Marks

B. Standard of passing- **Internal 08- University 32= Annual Marks 40**

C. All Courses of F. Y. B. A. must be cleared

D. A.T.K.T.Rules- Yes

E. Award of class- **S.Y.B.A. Pass**

F. External students- **S.Y.B.A. Pass with Geography General at S.Y. B. A.**

G. Setting of Question Papers / Pattern of Question Paper

Internal Exam- 60 Marks = (Converted into 20 Marks)

Question 1. Answer in 20 words- 14marks (any 7 out of 10)
Question 2. Answer in 50 words -08 marks (any 2 out of 4)
Question 3. Answer in 150 words- 18 marks (any 3 out of 5)
Question 4. Answer in 300 words- 20 marks (any 1 out of 2)

University Exam- 80 Marks =

Question 1. Answer in 20 words- 20 marks (any 10 out of 15)
Question 2. Answer in 50 words -10 marks (any 2 out of 4)
Question 3. Answer in 150 words- 20 marks (any 2 out of 4)
Question 4. Answer in 300 words- 30 marks (any 2 out of 4)

G. Verification / Revaluation- **Yes**

6. Structure of the Course

a. Compulsory paper- **T.Y.B.A. General**

b. Optional paper- **Yes**

c. Question Paper and Papers etc. - **One**

d. Medium of Instructions- **Marathi and English**

7. Equivalence of Previous Syllabus along with Propose Syllabus- **Yes**

8. University Terms- **Annual**

9. Subject wise Detail Syllabus – **As per attached Sheets**

10. Recommended Books- **Mentioned in Syllabus**

Qualification of Teacher-**M.A./M.Sc. (Geography), as per UGC and University norms**

Structure /Pattern of Syllabus- T.Y.B.A

1. Title of the course – **Gg.-320: Agriculture Geography (S-3)**

2. Preamble of the Syllabus

i.To introduce the students to the basic principles and concepts in Agriculture Geography

ii. To acquaint the students with the applications of Agriculture Geography in different areas and development.

iii. The main aim is to integrate the various factors of Agriculture development and to acquaint the students about this dynamic aspect of Agriculture Geography

3. Introduction: Pattern –**Annual (20 marks internal, 80 marks University)**

4. Eligibility- **S.Y.B.A. with Geography Special at S.Y. B. A.**

5. Examination-

A. Pattern of examination

i. Internal Term -End and University Exam.

ii. Pattern of Question Paper- 20 : 80

Internal Exam- 60 Marks = (Converted in to 20 Marks)

University Exam- 80 Marks

B. Standard of passing- **Internal 08- University 32= Annual Marks 40**

C. All Courses of F. Y. B. A. must be cleared

D. A.T.K.T.Rules- Yes

E. Award of class- **S.Y.B.A. Pass**

F. External students- **Not Eligible**

G. Setting of Question Papers / Pattern of Question Paper

Internal Exam- 60 Marks = (Converted into 20 Marks)

Question 1. Answer in 20 words- 14marks (any 7 out of 10)
Question 2. Answer in 50 words -08 marks (any 2 out of 4)
Question 3. Answer in 150 words- 18 marks (any 3 out of 5)
Question 4. Answer in 300 words- 20 marks (any 1 out of 2)

University Exam- 80 Marks =

Question 1. Answer in 20 words- 20 marks (any 10 out of 15)
Question 2. Answer in 50 words -10 marks (any 2 out of 4)
Question 3. Answer in 150 words- 20 marks (any 2 out of 4)
Question 4. Answer in 300 words- 30 marks (any 2 out of 4)

G. Verification / Revaluation- **Yes**

6. Structure of the Course

a. Compulsory paper- **T.Y.B.A. General**

b. Optional paper- **Yes**

c. Question Paper and Papers etc. - **One**

d. Medium of Instructions- **Marathi and English**

7. Equivalence of Previous Syllabus along with Propose Syllabus- **Yes**

8. University Terms- **Annual**

9. Subject wise Detail Syllabus – **As per attached Sheets**

10. Recommended Books- **Mentioned in Syllabus**

Qualification of Teacher-**M.A./M.Sc. (Geography), as per UGC and University norms**

Structure /Pattern of Syllabus- T.Y.B.A

1. Title of the course – **Gg. 320: Population and Settlement Geography (S-3)**

2. Preamble of the Syllabus

i. The course in meant to provide an understanding of spatial and structural dimensions of population.

ii. The course is further aimed at familiarizing the students with global and regional distribution of population & equips them for comprehending the Indian situation.

iii. The aims of this course are to acquaint the students with the spatial and structural characteristics of human settlement under varied environment conditions.

3. Introduction: Pattern –**Annual (20 marks internal, 80 marks University)**

4. Eligibility- **S.Y.B.A. with Geography Special at S.Y. B. A.**

5. Examination-

A. Pattern of examination

i. Internal Term -End and University Exam.

ii. Pattern of Question Paper- 20 : 80

Internal Exam- 60 Marks = (Converted in to 20 Marks)

University Exam- 80 Marks

B. Standard of passing- **Internal 08- University 32= Annual Marks 40**

C. All Courses of F. Y. B. A. must be cleared

D. A.T.K.T.Rules- Yes

E. Award of class- **S.Y.B.A. Pass**

F. External students- **Not Eligible**

G. Setting of Question Papers / Pattern of Question Paper

Internal Exam- 60 Marks = (Converted into 20 Marks)

Question 1. Answer in 20 words- 14marks (any 7 out of 10)
Question 2. Answer in 50 words -08 marks (any 2 out of 4)
Question 3. Answer in 150 words- 18 marks (any 3 out of 5)
Question 4. Answer in 300 words- 20 marks (any 1 out of 2)

University Exam- 80 Marks =

Question 1. Answer in 20 words- 20 marks (any 10 out of 15)
Question 2. Answer in 50 words -10 marks (any 2 out of 4)
Question 3. Answer in 150 words- 20 marks (any 2 out of 4)
Question 4. Answer in 300 words- 30 marks (any 2 out of 4)

G. Verification / Revaluation- **Yes**

6. Structure of the Course

a. Compulsory paper- **T.Y.B.A. General**

b. Optional paper- **Yes**

c. Question Paper and Papers etc. - **One**

d. Medium of Instructions- **Marathi and English**

7. Equivalence of Previous Syllabus along with Propose Syllabus- **Yes**

8. University Terms- **Annual**

9. Subject wise Detail Syllabus – **As per attached Sheets**

10. Recommended Books- **Mentioned in Syllabus**

Qualification of Teacher-**M.A./M.Sc. (Geography), as per UGC and University norms**

Structure /Pattern of Syllabus- T.Y.B.A

1.Title of the course – **Gg.301:Techniques of Spatial Analysis (S-4)**

2.Preamble of the Syllabus

i. To introduce the students SOI Toposheets Arial Photographs & Satellite Image to acquire the knowledge physical & cultural features.

ii. To train the students to handle these statistics towards analyzing the geographical problems.

3. Introduction: Pattern –**Annual (100 MarksUniversity)**

4. Eligibility- **S.Y.B.A. with Geography as a special subject**

5. Examination-

A. Pattern of examination-

University Exam- 100 Marks

B. Standard of passing- **University - Annual marks 40**

C. ATKT rules- **Yes**

D. Award of class- S**.Y.B.A. Pass**

E. External students-**Not Eligible**

F. Setting of question papers / pattern of question paper

University Exam- 100 Marks = As per scheme of marking

G. Verification / Revaluation- **No**

6. Structure of the Course

a. Compulsory paper- **T.Y.B.A.**

b. Optional paper- N**o**

c. Question paper and papers etc. – **As Per Batch**

d. Medium of instructions- **Marathi and English**

7. Equivalence of previous syllabus along with propose syllabus- **Yes**

8. University terms- **Annual**

9. Subject wise detail syllabus – **As per attached sheets**

10. Recommended books- **Mentioned in Syllabus**

Qualification of teacher-**M.A./M.Sc.(Geography), as per UGC and University norms**

Savitribai Phule Pune University, Pune
T.Y.B.A
Gg. 301: Techniques of Spatial Analysis (S-4)
Effective from-June-2015

Workload: Six periods per week per batch (12 students for per Batch)
(Examination for the course will be conducted at the end of academic year).

Objectives:

1. To Introduce the Students with SOI Toposheets and to acquire the Knowledge of Toposheet Reading/Interpretation.
2. To familiarize the students with the weather instruments and their applications in Geographical phenomena.
3. To acquaint the students with IMD weather maps and to gain the knowledge of weather map Reading / interpretation.
4. To train the students in elementary statistics as an essential part of geography.
5. To awareness about GIS among the students.

Section - I

Unit No.	Topic	Learning Points	Periods
1	Toposheets	a. Introduction to Survey of India (SOI) toposheets, Marginal Information, Grid reference, Conventional signs and symbols b. Types of toposheet/Indexing of toposheets i. 1: 1000000/Million sheet ii. 1:250000/Degree sheet/Quarter inch sheet iii. 1:100000/Half inch sheet iv. 1:50000/One inch sheet v. 1:25000 vi. 1: 5000	15
2.	Methods of Relief Representation	1. Methods of Relief Representation a. Qualitative :- Hachures, Hill shading, Layer Tint b. Quantitative:- Contours, Form lines, Bench Marks, Spot Heights, Triangulation Mark, Relative Height (r) 2. Representation of Relief features by Contours a. Concave Slope, Convex Slope, Steep Slope, Gentle Slope, Terraced / Uniform b. Conical Hill, Spur, Plateau, Ridge, Saddle, Pass, Cliff & Waterfall 3. Profile a. Drawing and Description of Cross Profile of any Region from toposheet b. Drawing and Description of Longitudinal Profile of a Road or a River	15
3.	Toposheet Reading, Interpretation & data generation	1. Reading of at least three SOI toposheets one each for Plain, Plateau and Mountainous/hilly Region 2. One day field Excursion for Orientation of toposheet, Observation and Identification of Geographical Features and Preparation of a Brief Report	15

4.	Application of Remote Sensing Techniques in Geography	1. Introduction of Aerial Photographs & Satellite Image 2. Stereoscopic View of Aerial Photographs & Satellite Image and Identification of Geographical features 3. Use of Computer open source software for visualization of Arial Photographs & Satellite Image	15

Section - II

5.	Weather Maps & Reading	a. Introduction to Weather Maps b. Symbols in Daily Weather Report used by India Meteorological Department (IMD) c. Isobaric pattern Cyclones, Anti cyclones, V shaped Cyclones, V Shaped Anti Cyclones , Col a. Reading of Weather Map of Three Seasons i. Summer ii. Monsoon iii. Winter b. One day visit to nearby weather station of IMD	12
6.	Geographical Data & Measures of Central Tendency	a. Spatial and Temporal data b. Discrete and Continuous series c. Grouped and Ungrouped data d. Meaning and description of central tendencies- Mean, Mode, Median e. Calculation of Mean, Mode, Median for ungrouped and grouped data (two examples each)	12
7.	Measures of dispersion	a. Variance and Standard deviation for ungrouped and grouped data (two examples each)	06
8.	Correlation & Regression Testing of Hypothesis,	a. Correlation and regression i. Concept of bivariate correlation and regression ii. Meaning of coefficient of correlation iii. Calculation of Pearson's Product-Mount iv. Correlation Coefficient (Two examples) v. Calculation of Spearman Rank order vi. Coefficient (Two examples) b. Parametric and Non-parametric tests i. Chi-square test (One-sample case only) ii. Student's t-test (Comparison of sample means)	10
9	Field Excursion/ Village Survey Report	a. One short tour of two days duration and preparation of tour report OR One long tour of more than five days duration anywhere in the country and preparation of tour report OR Village survey and preparation of report	20

Suggested Reading:

1. Aher A.B., Chodhari A. P. & Bharambe S.N. Techniques of Spatial Analysis Prashant Publication Jalgaon 2015
2. David Unwin, Introductory Spatial Analysis, Methuen, London, 1981.
3. Gregory, S. Statistical Methods and the Geographer, Longman, London, 1978.
4. Hammond R and P.S. McCullagh Quantitative Techniques in Geography: An Introduction, Clarendan Press, Oxford, 1974.
5. John P.Cole and Cuchlaine A. M. King, Quantitative Geography, John Wiley, London, 1968.
6. Johnston R. J., Multivariate Statistical Analysis in Geography, Longman, London. 1973.
7. Koutsoyiannis, Theory of Econometrics, Mcmillan, London, 1973.
8. Maurice Yeats, An Introduction to Quantitative Analysis in Human Geography, McGraw Hill, New York, 1974.

9. Aronoff S. Geographic Information Systems: A Management Perspective, DDL Publication Ottawa. 1989.
10. Burrough P.A . Principles of Geographic information Systems for Land Resource Assessment Oxford University Press, New York.1986.
11. Fraser Taylor D.R. Geographic information Systems. Pergamon Press, Oxford.1991.
12. Maquire D. J. M.F. Goodchild and D. W. Rhind (eds.). Geographic information Systems:Principles and Application. Taylor & Francis, Washington. 1991.
13. Mark S Monmonier . Computer-assisted Cartography. Prentice-Hall, Englewood Cliff, New Jersey, 1982.
14. Peuquet D.J. and D.F. Marble, Introductory Reading in Geographic Information Systems. Taylor & Francis, Washington.1990.
15. Star J and J. Estes. Geographic Information Systems: An Introduction. Prentice- Hall, Englewood Cliff, New Jersey, 1994.
16. Peter Haggett, Andrew D. Cliff, & Allan Frey, Location Methods Vol. I and II, Edward Arnold, London, 1977.
17. Misra, R.P. and Ramesh, A. Fundamentals of Cartography, McMillan Co., New Delhi,1986.
18. Pal, S.K. Statistics for Geoscientists — Techniques and Applications, Concept, New Delhi,1998.
19. Robinson, A.H. et al.: Elements of Cartography, John Wiley & Sons, U.S.A.,1995.
20. Sarkar A.:K Practical Geography: A Systematic Approach, Oriental Longman, Calcutta, 1997.
21. Singh, R.L. and Dutt, P.K.: Elements of Practical Geography, Kalyani Publishers, New Delhi,1979
22. Choudhar A. H., Choudhari J. V. Practical Geography, K. S. Publication, Pune (2013).

Savitribai Phule Pune University, Pune
T.Y.B.A
Gg.: 310 Regional Geography of India (G-3)
June 2015

Objective : -

1. To acquaint the students with geography of our Nation.
2. To make the student aware of the magnitude of problems and Prospects at National level.
3. To help the students to understand the inter relationship between the subject and the society.
4. To help the students to understand the recent trends in regional studies.

SECTION - I

Sr. No.	Topic	Sup Topic	Learning Points	Periods
1	Introduction	Location , Extent and Geopolitical Significance	1.Historical Background 2.Location and Extent 3.Relationship with Neighboring Countries 4.Geopolitical Importance of Indian Ocean.	10
2	Physiography	Major Physiographic Regions and their Importance	1. The Northern Mountains 2.The North Indian Plains 3.The Peninsular Plateau 4.The Costal low lands 5.The Islands	12
3	Drainage	Drainage System of India The Himalayan River System The Peninsular River System	1.The Indus , The Ganga , The Brahmaputra 2.East Flowing Rivers- Mahanadi, Godavari, Krishna, Kaveri. 3.West Flowing Rivers- Narmada, Tapi, Mahi 4.Rivers of the Sahyadri - Amba & Damanganga	12
4	Climate	Characteristics , Origin and Mechanism of Monsoon, Various Seasons	1. Characteristics of Indian Climate 2.Role of Various Controlling Factors on Climate of India 3.Monsoon: Origin and Mechanism 4.Various Seasons and Weather Associated with them	11

SECTION – II

5	Soils and Natural Vegetation	Types and Distribution	Types of Soils and its Distribution Soil Degradation and Conservation Types of Natural Vegetation and its Distribution	12

			Deforestation and Conservation	
6	Minerals and Energy Resources	Mineral Resources Energy Resources	1.Mineral Resources & its distribution Iron ore, Manganese, Bauxite, Copper 2.Energy Resources- a)Major Conventional & its Distribution Coal, Mineral Oil, Natural Gas b)Non-conventional - Hydroelectricity, Solar energy, Wind energy, Biogas, Atomic energy	12
7	Agriculture	Significance and Recent Trends in Agriculture	1. Significance of Agriculture in Indian Economy 2. Green Revolution 3. White Revolution 4.Blue Revolution 5. Livestock Resources, 6.Tissue Culture & Horticulture 7. Poly House and Agriculture	11
8	Planning and Development	Regional Planning and development	1.Concept, Objectives, Need, Nature of Regional Planning 2.Experience of Regional Planning in India 3.Regional Development of Maharashtra	10

Suggested Readings:

1. Aher A.B , Chaodhari A. P & Chaodhari Archna. Regional Geography of India Prashant Publication Jalgaon 2015
2. Deshpande C.D: India-A Regional Interpretation Northern Book Centre, New Delhi.1992.
3. Farmer, B.H.: An Introduction to South Asia. Methuen, London, 1983.
4. Govt. of India: India - Reference Annual, 2001 Pub. Div, New Delhi, 2001.
5. Govt. of India: National Atlas of India, NATMO Publication, Calcutta..
6. Govt. of India: The Gazetteer of India. Vol I & III Publication Division, New Delhi, 1965.
7. Learmonth, A.T.A. et.al(ed.) : Man and Land of South Asia Concept, New Delhi.
8. Mitra, A.: Levels of Regional Development India Census of India, Vol I, Part I-A (i) and (ii) New Delhi, 1967.
9. Routray, J.K.: Geography of Regional Disparity Asian Institute of Technology, Bangkok, 1993.
10. Shafi, M: Geography of South Asia, McMillan & Co., Calcutta, 2000.
11. Singh, R.L.(ed.): India: A Regional Geography. National Geogphical Society. India, Varanasi, 1971.
12. Spate, O.H.K. and Learmonth, A.T.A.; India and Pakistan - Land, People and Economy Methuen & Co., London, 1967.
13. P. G. Saptarshi, J. C. More, V. R. Ugale & A. H. Musmade :A Geographical Region of India : Diamond Publication (2009) (Marathi)
14. Patil S. G., Suryawanshi R. S., Pacharne S., Choudhar A. H. : Economic Geography, Atharav Prakashan, Pune. (2014) (Marathi).
15. Aher A. B. , Arekar R.: Commercial Geography, Atharav Prakashan, Pune. (2013) (Marathi).
16. Datt & Sunderm: Indian Economy (2014)

Savitribai Phule, Pune University, Pune
T.Y.B.A (General Geography) G-3
Gg. 310:HUMANGEOGRAPHY
From June 2015

Objectives:

1. This course is to acquaint the students with the nature of man-environment relationship and human capability.
2. To adopt and modify the environment under its varied conditions from primitive life style to the modern living;
3. To identify and understand environment and population in terms of their quality and spatial distribution pattern.
4. To comprehend the contemporary issues facing the global community.

Section – I

Sr. No.	Topic	Learning Points	Periods
1	Introduction to Human Geography	a)Meaning and Definition of Human Geography. b)Nature, Scope and Importance of Human Geography, approach of Human Geography & Branches of Human Geography	10
2	Development of Human Geography	a) Pre-historical Period. b) Medieval Period of Human Geography. c) Modern Period of Human Geography. d) Concepts of Determinism, Possibilism, Stop and Go Determinism	13
3	Human Evolution and Races	a) Stages of Human Evolution. b) Meaning and Definition of Human Race c) Bases of Human Race d) Griffith Taylor's Theory of Human Race e) Pure and Mixed Races	12
4	Form of Adaptation to the Environment	a) Human life in Cold Region - ESKIMO b) Human life in Tropics - PYGMY and BUSHMEN	10

Section – II

5	Study of Indian Tribes	Regional Distribution of Tribes in India a) Bhill b) Gond c) Naga d) Tribes in Maharashtra	11
6	Human Culture	a) World Languages & their distribution b) World's Major Religions & their distribution d) Distribution of Languages & Religions in India	12
7	Movement of Mankind	a) Meaning and Definition of Migration b) Type of Migration c) Causes & Effects of Migration d) Migration in Modern Period	11
8	Population & Resources	a) World Population Distribution b) Effects of Population Growth on Natural Resources c) Malthus Theory of Population Growth d) Population as a Resource	11

Suggested Readings:

1. Aher A. B , Pail V. J. Human Geography Prashant Publication Jalgaon 2015
2. Aher A. B , Markad D.M. Human Geography Payal Publication Pune 2015
3. Bergwan, Edward E: Human Geography; Culture, Connections and Landscape, Prentice-Hall, New Jersey.1995.
4. Carr, M.: Patterns, Process and change in Human Geography. MacMillan Education, London,1987.
5. Fellman, J.L.: Human Geography—Landscapes of Human Activities. Brown and Benchman Pub., U.S.A., 1997.
6. DeBlij H.J.: Human Geography, Culture, Society and Space John Wiley, New York,1996.
7. Johnston, R.J. (editor).: Dictionary of Human Geography Blackwell, Oxford, 1994:
8. Mc Bride, P.J.: Human Geography Systems, Patterns and Change, Nelson, U.K. and Canada,1996.
9. Michael, Can: New Patterns: Process and Change in Human Geography Nelson,1997
10. Rubenstein, J.H. and Bacon R.S.: The Cultural Landscape — an Introduction to Human Geography. Prenice Hall, India, New Delhi,1990.
11. Singh, K.N. :People of India, An introduction Seagull Books, 1992
12. Spate O.H.K. and Learmonth A.T.A. : India and Pakistan Methuen, London.1968.
13. U. V. Jagdale & P. G. Saptarshi: Human Geography (2007), Diamond Publication (Marathi)

SAVITRIBAI PHULE UNIVERSITY OF PUNE
T.Y.B.A. GEOGRAPHY
Gg-320 – AGRICULTURAL GEOGRAPHY (S-3)
From June – 2015

Objectives: 1. To Introduce students Agricultural activities and its relation with Geography.
2. To Familiarize the students with new modern technical methods and their applications in Agricultural activities.
3. To enable students to apply Previously knowledge in Problems and Prospects in agriculture

Section- I

Sr. No.	Topic	Units	Sub Units	Periods
1	Introduction of Agricultural Geography	**A.** Meaning ,Nature & Scope **B**. Approaches **C.** Importance D. Trends	Definition, Nature & Scope of Agricultural Geography Approaches 1. Regional approach 2. Systematic approach 3. Commodity approach 4. Recent approaches Importance of Agriculture in Indian Economy Recent Trends in Agriculture Geography	12
2	Determinates of Agriculture	**A.** Physical Factors **B.** Economic Factors **C.** Social Factor **D.** Technological Factors	1.Relief 2.Climate 3.Soil 1.Capital, 2.Transportation 3.Market, 4.Storage, 5. Export Import 1.Land holding, 2.Land fragmentation 3. Labour, 4.Traditional Methods 5. Farmers view towards agriculture 1. Irrigation 2.Mechanization 3.Manures, Fertilizers 4.Pesticides	15
3	Types of Agriculture	Characteristics of A. Subsistence Agriculture **B.** Commercial Farming	1.Shifting Cultivation 2.Dry land farming 3.Intensive Subsistent farming 1.Mixed farming 2.Horticulture / Truck farming 3. Community farming	10
4	Problems & Prospects of Agriculture	Problems and Prospects with Indian examples	1.Natural 2.Economical 3.Social 4.Political	08
		Section II		
5	Role of irrigation in Agricultural Development	**A.** Need of Irrigation **B.** Types of Irrigation **C.** Methods of Irrigation	1.Importan of irrigation 1.Canals 2.Lake 3.Well 4.Borewell & Tube well 1.Flood irrigation 2.Ring &Basin 3.Drip irrigation 4.Sprinkler irrigation	12
6	Dry Land farming And Watershade Management	**A.** Concept & Need **B.** Methods of Watershed Management	1.Concept & Need, Dry Land Farming Management in India 2. Concept of Watershed Management **Methods :** 1. Continuous Contour Tranches (CCT) 2.Gabian Bunds, 3.Nala Bunding 4. Biological Bunds, 5. Kohlapur Type (K.T.) weir	15

			6.Vanrai Bunds, 7.Perculation Tanks 8.Farm Lake / Ponds, 9. Dams, 10. Barrages	
7	Allied Areas in Agriculture & Agriculture Development	Concept of Agricultural Development with new Techniques	1.Dairy farming 2.Poultry 3.Sheep and Goat farming 4.Nursery 5.Api Culture 6. Fish Farming 6.Poly houses 7.Tissue Culture 8.Food & Fruit Processing 9.Agro-Tourism	10
8	Sustainable Agricultural Development and Agriculture in India	A. Ecological Conservation B. Characteristics of Indian agriculture	1.Waste Land Management 2.Organic farming 3.Crop rotation 4.Group Plantation 5.Pest and Weed Management 6.Agro Forestry 1.Green Revolution in India-Problems Associated with Indian Agriculture 2.National Agricultural Policy 3.Various Schemes of Central and State Govt. for Agricultural Development and Farmers	08

Suggested Readings

1. Aher A. B., Salunkhe V. Agriculture Geography, Diamond Publication, Pune (2015)
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3. Berry, B.J.L. et. al. : The Geography of Economic Systems. Prentice Hall, New York, 1976.
4. Brown, L.R. : The Changing World Food Prospects - The Nineties and Beyond. World Watch Institute, Washington D.C., 1990.
5. Dyson, T. : Population and Food - Global Trends and Furure Prospects. Routledge, London, 1996.
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7. Grigg, D.B. : The Agricultural Systems of the World. Cambridge University Press, New York 1974.
8. Hartshorn, T.N. and Alexander, J.W. : Economic Geography. Prentice Hall, New Delhi, 1988
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11. Morgan, W.B. : Agriculture in the Third World - A Spatial Analysis. Westview Press, Boulder, 1978.
12. Sauer, C.O. : Agricultural Origins and Dispersals. M.I.T. Press, Mass, U.S.A., 1969.
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14. Singh, J. and Dhillon, S.S. (1988), "Agricultural Geography", 2nd edition, Tata McGraw-Hill, New Delhi
15. Wigley, G.(1981), Tropical Agriculture: The Development of Production, 4th edition, Arnold, London
16. Saptarshi P.G., More J.C., Ugale V.R., Musmade A.H.(2009), "India A Geographical Analysis" Diamond, Pune.
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Savitribai Phule, Pune University, Pune
T.Y.B.A
Gg-320: Population and Settlement Geography (S-3)
Effective from-June-2015

Objective:-

1. To provide an understanding of spatial and structural dimensions of population
2. To familiarizing the students with global and regional level problems.
3. To acquaint the students with the spatial, political and structural characteristics of human settlement under varied environmental conditions.

Section-A. Population Geography

Unit No.	Topic	Sub Topic	Learning Points	Periods
1	Introduction	Nature and Scope	Definitions, Nature and Scope of Population Geography	10
		Source of Population Data	Census, National Sample Survey, Sample Registration Survey, NFHS, DLHS Data, Demographic Surveys and other Sources	
2	Population Dynamics	Spatial Pattern of Distribution	1) Determinates of Distribution and Density of Population 2) Distribution of Population – World & Indian Scenario 3) Population Growth- Global & Indian Trend	10
		Composition of Population	Population Composition: Age and Sex, Rural-Urban &Economic	
3	Demographic Attributes	Human Migration	1. Migration-Classification, Determinants and Consequences of Migration. 2.Measures – Fertility, Morbidity and Mortality, Marital Status 3.Human Development Index 4. Illegal Migrations and its Impacts Migration and its Impacts on Smarts Cities and Smart Villages	14
		Theories of Population Growth	1) Demographic Transition Model [DTM] 2) Malthus: Population Theory	
4	Population Policies	Population Policies and Programmes	1.Population Policies in the Context of Growth, Structure, Distribution &Quality Life 2. Evolution of Family Welfare Programme in India 3.National Population Policies in India [After 1991]	11

Section-B- Settlement Geography

5	Introduction of Settlement Geography	Definition, Nature and Scope	Definition, Nature and Scope of Settlement Geography	12
		Characteristics	1) Characteristics of Settlement Geography 2) Branches of Settlement Geography	
6	Man-Environment Relationship	Factors Influencing the Growth and Distribution of Settlements.	1. Physical 2. Economic 3. Social 4. Political	10
7	Settlement	Site and Structure	Site, Situation, Type, Size, Spacing and Patterns	12

	Site and Structure		of Settlements	
8	Concepts of Settlement and Urbanization	Various Concepts with examples	1. Urbanization 2. Centrality 3. City Region 4. Urban Fringe 5. Rank-size Rule 6. Smart City Concept 7. Smart Village 8. C.B.D. 9. Hierarchy of Settlement	11

Suggested Readings

1. Beaujeu-Garnier, J. : Geography of Population (Translated by Beaver, S.H.) Longmans, London, 1966.
2. Census of India 2001 Series-I India Provisional Population Totals. Published by Registrar General & Census Commissioner, India, 2001.
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8. Srinivasan K. and M. Vlassoff Population Development nexus in India: challenges for the new millennium. Tata McGraw Hill Publishing Co. Ltd., New Delhi 2001.
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10. Trewartha, G.T. : The More Developed Realm: A Geography of its Population, Pergamon Press, Oxford, 1978.
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12. UNDP: Human Development Report, Oxford University Press 2001.
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14. Carter H.: The Study of Urban Geography, Edward Arnold, London, 1972.
15. Chisholm, M.: Rural Settlement and Land Use, Hutchinson, London,1970.
16. Clout, R.D. :Rural Geography, Pergamon Press, London,1970.
17. Deshpande, C.D.: Shehre, Continental Prakashan, Pune, 1983 (Marathi).
18. Dickinson, R.E. City, Region and Regionalism, Kegan Paul, Trench, Trubner & Co., London, 1947.
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20. Money, D.C. : Patterns of Settlements, Evan Brothers, London, 1972.
21. Mukerji, R.K. : Man and His Habitation, Popular Books, Bombay, 1968.
22. Nangia S.: Delhi Metropolitan Region, Rajesh Publications, 1976.
23. Perpillou, A.: Human Geography, Longmans, London, 1966.
24. Singh, R.L.: Readings in Rural Settlement Geography, Banaras Hindu University, Department of Geography, Varanasi, 1972.

University of Pune

Two Year M. Sc. Degree Course in Chemistry

M. Sc. Chemistry

(Credit and Semester based Syllabus to be implemented from Academic Year 2013-14)

1) Title of the Course: M.Sc. Chemistry

2) Preamble of the Syllabus:

Master of Science (M.Sc.) in Chemistry is a post graduation course of University of Pune. The credit system to be implemented through this curriculum, would allow students to develop a strong footing in the fundamentals and specialize in the disciplines of his/her liking and abilities.

The students pursuing this course would have to develop in depth understanding of various aspects of the subject. The conceptual understanding, development of experimental skills, designing and implementation of novel synthetic methods, developing the aptitude for academic and professional skills, acquiring basic concepts for structural elucidation with hyphenated techniques, understanding the fundamental biological processes and rationale towards computer assisted drug designing are among such important aspects.

3) Introduction:

Salient Features of the Credit System:

1. Master's degree course in Chemistry would be of 100 credits, where one credit course of theory will be of one clock hour per week running for 15 weeks and one credit for practical course will consist of 15 of laboratory exercise including the revision and setting up the practical. Thus, each credit will be equivalent to 15 hours.
2. Student will have to take admission in Chemistry Department and complete 75 credits incorporated in the syllabus structure of Chemistry. The remaining 25 credits shall be chosen from courses offered by the Chemistry Department or other Departments of the University/College with credit system structure.
3. Except practical credits wherever applicable, students may be allowed to complete less courses per semester on the condition they complete the degree in maximum of four years. This facility will be available subject to the availability of concerned courses in a given semester and with a maximum variation of 25 credits (in case of fresh credits) per semester.
4. Every student shall complete 100 credits in a minimum of four semesters. All Semesters will have average 25 credits each.
5. The student will be declared as failed if s/he does not pass in all credits within a total period of four years. After that such students will have to seek fresh admission as per admission rules prevailing at that time.
6. Academic calendar showing dates of commencement and end of teaching, internal assessment tests and term end examination will be prepared and duly notified before commencement of each semester every year.
7. Project course should not be greater than 5% of the total credits of the degree course. Project course is equivalent to 4 credits.

Instructions for the Students

The students seeking admission to M.Sc. Chemistry course is hereby informed that they are supposed to adhere to the following rules:

1. A minimum of 75 % attendance for lectures / practical is the pre-requisite for grant of term.
2. There shall be tutorial / practical / surprise test / home assignment / referencing of research papers / seminar / industrial visits / training course as a part of internal assessment in each semester. The students are supposed to attend all the tests. The students should note that re-test will not be given to the student absent for the test/s.
3. The students opting for dissertation course shall follow the rules framed for the same.
4. Industrial / Institute - Visit and or Industrial Workshops / Laboratory Workshops / Training Programme is a compulsory component of the syllabus. The students are supposed to attend all the Industrial Workshops / Laboratory Workshops / Training Programme organized by the department. The students shall attend these programs at their own cost.

4) Eligibility:

The candidate should have a B.Sc. degree with Chemistry as principal subject **OR** B.Sc. (General) degree with Chemistry (Electronics) as one of the subsidiary subjects.

Admission: Admissions will be given as per the selection procedure / policies adopted by the respective college, in accordance with conditions laid down by the University of Pune.
Reservation and relaxation will be as per the government rules.

5) Examination

[A] Pattern of Examination

Evaluation of Students:

1) The In-semester and End-Semester examinations will be of 50 marks each.
2) Student has to obtain 40% marks in the combined examination of In-Semester and End-Semester assessment with minimum passing of 30% passing in both assessments separately.
3) A student cannot register for third semester if s/he fails to complete the 50% credits of the total expected within two semesters.
4) Internal marks will not change. Student cannot repeat internal assessment. If student misses internal assessment examination, s/he will have second chance with the permission of the concerned teacher. But it will not be right of the student. It will be the discretion of the concerned teacher and internal departmental assessment committee. In case s/he wants to repeat Internal, s/he can do so only by registering for the said courses during $5^{th}/6^{th}$semester whichever is applicable.
5) There shall be revaluation of answer script of end semester examination, but not of internal assessment papers.
6) Internal assessment answer scripts may be shown to the concerned student but not end semester answer script.

i. **In-semester Examination**: Internal assessment for each course would be continuous and dates for each tutorials/practical tests will be pre-notified in the time table for teaching or placed separately as a part of time table. Department / College Internal Assessment Committee will coordinate this activity

a) **Theory Courses**: Conducting written tests should not be encouraged. More focus should be on non-written tests. Students should be encouraged to conduct various academic activities. A teacher must select a variety of the procedures for internal assessment suggested as follows.

a) Mid-term test
b) On-line test
c) Computer based examination
d) Open book test (concerned teacher will decide the allowed books)
e) Tutorial
f) Surprise test
g) Oral
h) Assignments
i) Review of research paper
j) Seminar presentation
k) Journal/Lecture/Library notes

Student has to preserve the documentation of the internal assessment except midterm test answer script. It is the responsibility of the student to preserve the documents.

b) **Practical Courses**: It is a continuous evaluation process. Practical courses will be evaluated on the basis of the following

1. Performance assessment of each experiment on the basis of attendance, punctuality, journal completion, practical skills, results, oral and analysis.
2. Test on practical may be conducted before the end-semester examination.
3. Assessment of each experiment shall be done for each practical weekly.
4. Assessment of the Activity will be based on any one of the following per practical course.
   i. Experimental and analytical skills
   ii. Synthesis of compounds
   iii. Evaluation of physical constants, purity of compounds
   iv. Fundamental understanding of instrumental techniques
   v. Recording and analysis of spectral data
   vi. Economic utilization of chemicals
   vii. Basic understanding of the experiment

The student strength of practical batch should be eight. Note that one practical session of 4 hour duration of one practical batch.

Project Course: Project will be evaluated by In-Charge of project batch in concern with project guide. Assessment will be done weekly in the respective batch. Evaluation will be on the basis of weekly progress of project work, progress report, referencing, oral, results and documentation.

ii. **End-Semester Examination**: End-Semester examination for 50 marks per course would be held about two weeks after completion of teaching for the semester. Paper setting and assessment for a particular course would be the responsibility of the course In-charge, and these activities would be coordinated by the Department Examination Committee. The Department Examination committee would undertake preparation of the result-sheets for the student

[B] Standard of Passing

Student has to obtain 40% marks in the combined examination of In-Semester and End-Semester assessment with minimum passing of 30% passing in both assessments separately.

[C] ATKT Rules

A student cannot register for third semester if s/he fails to complete the 50% credits of the total credits expected to be ordinarily completed within two semesters.

[D] Award of Class

Grades will be awarded from grade point average (GPA) of the credits.

GPA Rules:

1. The formula for GPA will be based on Weighted Average. The final GPA will not be printed unless a student passes courses equivalent to minimum 100 credit hours (Science). Total credits hours means the sum of credit hours of the courses which a student has passed.
2. A seven point grade system [guided by the Government of Maharashtra Resolution No. NGO – 1298 / [4619] / UNI 4 dt. December 11, 1999 and University regulations] will be followed. The corresponding grade table is attached herewith.
3. If the GPA is higher than the indicated upper limit in the third decimal digit then the student be awarded higher final grade (e.g. a student getting GPA of 4.492 may be awarded 'A')
4. For Semester I, II, III examinations, only the grade points will be awarded for each subject. Final GPA along with final grade will be awarded only at the end of IV semester. There is also a provision for verification and revaluation. In case of verification, the existing rules will be applicable. The revaluation result will be adopted if there is a change of at least 10% marks and in the grade of the course.
5. After the declaration of result, for the improvement of Grade, the student can reappear for the examination of 30 credits worth theory courses.
6. Grade improvement programme will be implemented at the end of the academic year. A student can opt for grade improvement programme only after the declaration of final semester examination i.e. at the end of next academic year after passing M.Sc. (Chemistry) examination and within two years of completion of M.Sc. (Chemistry). A student can appear for grade improvement programme only once.

Grade and Grade Point Average		
Marks	**Obtained Grade**	**Grade Points**
100 – 75	**'O'** Outstanding	06
74 – 65	**'A'** Very Good	05
64 – 55	**'B'** Good	04
54 – 50	**'C'** Average	03
49 – 45	**'D'** Satisfactory	02
44 – 40	**'E'** Pass	01
39 and less	**'F'** Fail	00

Final Grade Points	
Grade Points	**Final Grade**
5.00 – 6.00	**O**
4.50 – 4.99	**A**
3.50 – 4.49	**B**
2.50 – 3.49	**C**
1.50 – 2.49	**D**
0.50 – 1.49	**E**
0.00 – 0.49	**F**

Common Formula for Grade Point Average (GPA):

$$\text{GPA} = \frac{\text{Total of Grade Points earned} \times \text{Credit hours for each course}}{\text{Total Credit hours}}$$

B Grade is equivalent to at least 55% of the marks

[E] External Students: There shall be no external students.

[F] Setting of Question Paper / Pattern of Question Paper

For core (compulsory) theory courses, end semester question papers set by the University of Pune and centralized assessment for theory papers done as per the University instructions. Questions should be designed to test the conceptual knowledge and understanding of the basic concepts of the subject.

Theory examination will be of 2 hours duration for each theory course of 5 credits. There will be **two sections** for each paper. Each section will be of **25 marks** and the pattern of question paper shall be:

Question 1 (10 Marks)	5 compulsory sub-questions, each of 2 marks; answerable in 2-3 lines
Question 2 (10 Marks)	2 out of 4 – short answer type questions of 5 marks each; answerable in 8 – 10 lines
Question 3 (5 Marks)	1 out of 2 – numerical problem type question; note, spectral analysis, functioning of instrumental technique with components

[G] Verification / Revaluation

There is also a provision for verification and revaluation. In case of verification, the existing rules will be applicable. The revaluation result will be adopted if there is a change of at least 10% marks and in the grade of the course. There shall be revaluation of answer script of end semester examination, but not of internal assessment papers.

6) Structure of Course

Basic structure/pattern (Framework) of the proposed postgraduate syllabus for the two year integrated course leading to M.Sc. (Chemistry) in the colleges affiliated to Pune University.

a) Compulsory Papers

Theory: CHP-110, CHP-210, CHI-130, CHI-230, CHO-150, CHO-250, CHA-290

Practical: CHP-107, CHI-147, CHO-247

M. Sc. Chemistry - Course structure & Credits Distribution

Semester	Course Code	Course Title	No. of Units	No. of credits
Sem-I	CHP-110	Fundamentals of Physical Chemistry-I	04	04
	CHI-130	Molecular Symmetry & Chemistry of p-block elements	04	04
	CHO-150	Basic organic chemistry	04	04
	CHA-190	Safety in Chemical Laboratory and Good Laboratory Practices	04	04
	CHP-107	Practical Course (Physical Chemistry)	24 Practical Sessions	06
	CHI-147	Practical Course (Inorganic Chemistry)	24 Practical Sessions	06
Sem-II	CHP-210	Fundamentals of Physical Chemistry-II	04	04
	CHI-230	Coordination and Bioinorganic Chemistry	04	04
	CHO-250	Synthetic organic chemistry and spectroscopy	04	04
	CHA-290	General Chemistry	04	04
	CHO-247	Practical Course (Organic Chemistry)	24 Practical Sessions	06

b) Question Papers and papers etc.:

Theory

In-Semester Examination:	50 Marks
End-Semester Examination:	50 Marks

Practical

In-Semester Examination:	50 Marks
End-Semester Examination:	50 Marks

c) Medium of Instructions: English.

7) Equivalence of Previous Syllabus:

New Course (5 credit pattern; 20013-14 Pattern)	**New Course (4 Credit pattern; 2014 - 15 Pattern)**
CH-110	CHP-110
CH-130	CHI-130
CH-150	CHO-150
-	CHA-190
CH-107	CHP-107
CH-127	CHI-127
CH-210	CHP-210
CH-230	CHI-230
CH-250	CHO-250
CH-290	CHA-290
CH-247	CHO-247

8) University Terms:

Dates for commencement and conclusion for the first and second terms will be declared by the University authorities. Terms can be kept by only for duly admitted students. The term shall be granted only on minimum 75 percent attendance at theory and practical course and satisfactory performance during the term.

9) Qualification of Teacher:

i. M.Sc. (Chemistry) degree with NET/SET qualification.
ii. Recognition of Pune University as a post graduate teacher, by papers.

iii. Other criteria as per the guidelines of UGC and University of Pune.

M. Sc. Chemistry Part-I

Physical Chemistry

Semester - I

CHP-110: Fundamentals of Physical Chemistry-I (4 Credits)

SECTION-I (2 Credits, 24 L, 6 T)

Thermodynamics

1. Recapitulation:- Heat, work & Conservation of energy – The basic concepts, the first law, infinitesimal changes, mechanical work, work of compression & expansion, free expansion, expansion against constant pressure, reversible expansion. Heat:- heat capacity, enthalpy. State functions & differentials – State functions, exact & inexact differential, changes in internal energy, temperature dependence of the internal energy, temperature dependence of the enthalpy. Work of adiabatic expansion – Irreversible adiabatic expansion, reversible adiabatic expansion. (02 L)
2. The second law of Thermodynamics: Measuring the dispersal the entropy. The second law, the definition of entropy, the entropy changes in the system, natural events. Entropy changes in the universe – The enthalpy change when a system is heated. Entropy changes in surroundings. The entropy of phase transition. The entropy of irreversible changes. Concentrating on the system – The Helmholtz & Gibbs function, some remarks on the Helmholtz function. Maximum work, some remarks on Gibbs function. Evaluating the entropy & Gibbs function. The third law of Thermodynamics, Third law entropies standard molar Gibbs function. (05 L)
3. Combining First & Second law – One way of developing the fundamental equations properties of Gibbs function. The temperature dependence of the Gibbs functions. The pressure dependence of the Gibbs functions. The chemical potential of a perfect gas. The open system & changes of composition. (03 L)

4. Changes of State: Physical Transformation of pure materials. The stabilities of phases, Phase equilibrium & phase diagrams. The solid – liquid boundary. The liquid - vapor boundary. The solid-liquid-vapor boundary. (03 L)

5 Changes of State: Physical transformation of simple mixtures, partial molar quantities – Partial molar volume, Partial molar Gibbs function. The thermodynamics of mixing – the Gibbs function of mixing after thermodynamics mixing functions. The chemical potential of liquid-liquid mixture. Colligative properties – The common features, the elevation of boiling point. The depression of freezing point, solubility, osmosis. Mixtures of volatile liquid-vapor pressure diagram. (04 L)

6. Quantum Chemistry (07 L)

Historical development of quantum theory, failure of classical mechanics, black body radiation, photo electric effect, specific heats of solids, Atomic spectra, wave particle duality, uncertainty principles, Schrodinger equation, free particle, particle in one dimensional box, hydrogen like atoms (No derivation), atomic orbital's.

SECTION-II (2 Credits, 24 L, 6 T)

Chemical kinetics and reaction dynamics

1. Recapitulation: The rates of reaction, reaction rate, rate laws & rate constants, the determination of the rate law, first order, second order reactions, half lives, fractional order reactions. (02 L)

2. Accounting for rate laws, simple reactions, the temperature dependence of reaction rates, reactions approaching equilibrium, consecutive reactions, the steady state approximations, pre equilibria, unimolecular reactions. (05 L)

3. The kinetics of complex reactions: chain reaction- explosion, photochemical reactions-quantum efficiency, fast reactions-flash photolysis, flow techniques, relaxation methods.

(02 L)

4. Molecular reaction dynamics- collision theory-the basic calculations, the steric requirements, Diffusion control reactions- classes of reactions, diffusion and reactions, the details of diffusion, Activated complex theory- the reaction coordinate and the transition state, the formation and decay of the activated complex, how to use the Eyring equation, thermodynamics aspects, reactions between ions. (05 L)

5. Enzyme catalysts: Michaelis-Menten mechanism, limiting rate, Lineweaver Burk and Eadie plots enzyme inhibition, competitive and non-competitive inhibition. (04 L)

6. Molecular Thermodynamics: Molecular energy levels, Boltzmann distribution law, partition functions and ensembles, translational, rotational and vibrational partition functions of diatomic molecules, Obtaining energy, heat capacity, entropy free energy, equilibrium constants from partition functions, equipartition of energy, Maxwell-Boltzmann, Fermi-Dirac and Bose-Einstein statistics. (06 L)

References

1. Physical Chemistry- P.W.Atkin and De Paule 8th edition (2010)
2. Physical Chemistry-T. Engel and P. Reid, Pearson Education (2006)
3. Physical Chemistry and molecular approach- D. Mcquarie and J. Simon (University Science) (2000)
4. Physical Chemistry for Bilogical Sciences by Raymond Change (Universal books) (2000)
5. Physical Chemistry – Marron and Prouton
6. Physical Chemistry- G.M. Barrow, Tata McGrow Hill 1988
7. Quantum Chemistry- I. Levine 5^{th} edition, Prentice Hall, 1999.

Inorganic Chemistry

Semester - I

CHI-130: Molecular Symmetry & Chemistry of p-block elements (4 credits)

SECTION-I: Molecular Symmetry and its Applications

(2 Credits, 24 L, 6 T)

(a) Definitions and Theorems of Group Theory: Defining properties of a group, group multiplication table, some examples of group, subgroups, classes

(b) Molecular Symmetry and Symmetry Groups: Symmetry elements and operations, Symmetry planes and reflections, the inversion centre, proper axes and proper rotations, improper axes and improper rotation, products of symmetry operations, equivalent symmetry elements and equivalent atoms, general relations symmetry elements and symmetry operations, symmetry elements and optical isomerism, symmetry point groups, classes of symmetry operations, classification of molecular point groups.

(c) Representations of Groups: Matrix representation and matrix notation for geometric transformation, The Great Orthogonality Theorem and its consequence, character tables (No mathematical part)

(d) Group theory and quantum mechanics: Wave function as basis for irreducible representations

(e) Symmetry Adapted Linear Combinations: Projection operators and their use of construct SALC (Construction of SALC for sigma bonding for molecules belonging point groups: $D_{2h,}$ D_{3h} D_{4h}, C_{4v}, Td, Oh, normalization of SALC.

(f) Molecular Orbital Theory: Transformation properties of atomic orbital, MO's for Sigma bonding ABn molecules, tetrahedral AB_4 and Oh AB_6 cases.

References:

1) Chemical Applications of Group Theory, 3rd Edn., Author - F. A. Cotton (Wiley, New York)

2) Symmetry and spectroscopy of molecules, 2nd Ed. 2009; K. Veera Reddy, (New Age International Publication)
3) Group Theory and its Chemical Applications, P.K. Bhattarchrya

Section-II: Chemistry of Main group elements

(2 Credits, 24 L, 6 T)

1. Hydrogen and its compounds: Hydrides: Classification, electron deficient, electron precise and electron rich hydrides. PH_3 , SbH_3 , AsH_3 , Selenides, Tellurides **(2 L)**
2. Alkali and alkaline earth metals: Solutions in non-aqueous Media, Application of crown ethers in extraction of alkali and alkaline earth metals **(2 L)**
3. Organometallic Compounds of Li, Mg, Be,: Classification, Synthesis, Properties, Uses and Structure **(3 L)**
4. Boron Group: Boron Hydrides, preparation, structure and Bonding with reference to LUMO, HOMO, interconversion of lower and higher boranes, Metalloboranes, Carboranes, Reactions of Organoboranes **(4 L)**
5. Carbon Group: Allotropes of Carbon, C_{60} and compounds (fullerenes), Intercalation compounds of Graphite, Carbon nanotubes, synthesis, properties, structure-single walled, multi walled, applications **(2 L)**
6. Organometallic compounds of Si, Sn, Pb, Ga, As, Sb, Bi. Structures, synthesis, **(3 L)** Reactions
7. Nitrogen Group: Nitrogen activation, Boron nitride, Oxidation states of nitrogen and their interconversion, PN and SN Compounds, NOx and their redox chemistry **(3 L)**
8. Oxygen Group: Metal Selenides and Tellurides, oxyacids, and oxoanions of sulphur & nitrogen. Ring, Cage and Cluster compounds of p-block elements. Silicates, including Zeolites **(3 L)**
9. Halogen Group: Interhalogens, pseudo-halogen, Synthesis, Properties and Applications, Structure, Oxyacids and Oxoanions of Halogens, Bonding **(2 L)**

References:

1) Inorganic Chemistry : Shriver & Atkins (4th edition 2003, Oxford)
2) Concise Inorganic Chemistry, J. D. Lee, Fourth Edn.(Chapman and Hall)

3) Inorganic chemistry: principle of structures and reactivity, Huheey, Keiter, Keiter, Medhi, Pearson Education, 4th Edn. (2007).
4) Inorganic Chemistry: Catherine Housecroft
5) Inorganic Chemistry: Messler & Tarr, Pearson Publishers 3rd Edition
6) Organometallic Chemistry-A Unified Approach: R. C. Mehrotra & A. Singh

Organic Chemistry

Semester - I

CHO-150: Basic organic chemistry (4 Credits)

Section-I (2 credits, 24 L, 6 T)

1. **Structure and reactivity:** **(10 L)**
   a) Chemical bonding and basis of reactivity- Chemical bond, delocalization, conjugation, resonance, hyperconjugation, tautomerism, inductive effects.
   b) Acidity and basicity: various structural effects, hard and soft acid and base concept.
   c) Aromaticity: Benzenoid and non-benzenoid compounds, Huckels rule, antiaromaticity, Application to carbocyclic and heterocyclic systems, annulenes, azulenes, current concepts of aromaticity.
   d) Structure and stability of reactive intermediates, carbenes, nitrenes, carbocations, carbanions and free radicals.
2. **Stereochemistry**: **(14 L)**
   a) Sterochemical principles, enantiomeric relationship, distereomeric relationship, R and S, E and Z nomenclature in C, N, S, P containing compounds, Prochiral relationship, stereospecific and stereoselective reactions, optical activity in biphenyls, spiranes, allenes.
   b) Conformational analysis of cyclic and acyclic compounds.

Section-II

1. **Organic reactions:** **(2 credits, 24 L, 6 T)**
   a) **Substitution reaction**: **(10 L)**
   Aliphatic nucleophilic substitution-S_N1, S_N2 mechanism, NGP by pi and sigma bonds, classical and non-classical carbocations, phenonium ions, norbornyl system, carbocation rearrangement in NGP, SNi mechanism, nucleophilic substitution in allylic,trigonal and vinylic carbon.

Effect of structure, nucleophile, leaving group and solvent on rate of S_N1 and S_N2 reactions, ambident nucleophile and regioselectivity.

b) Aromatic Electrophilic substitution (4 L)

Arenium ion mechanism, orientation and reactivity, energy profile diagram, ortho, para, ipso attack, orientation in other ring systems, six and five membered heterocycles with one hetero atom.

Important reactions like Friedel crafts alkylation and acylation, Nitration, halogenation, formylation, chloromethylation, sulphonation, diazonium coupling.

Aromatic nucleophilic substitution (2 L)

S_NAr, S_N1, Benzyne and S_NR1 reactions, reactivity: effect of substrate structure, leaving group and attacking nucleophile.

c) Addition reactions (4 L)

Addition to C-C multiple bonds - mechanism and stereochemical aspects of addition reaction involving electrophile, nucleophile and free radicals, Regio and chemo selectivity, orientation and reactivity, conjugate addition.

d) Elimination reactions (4 L)

E1, E2, E1cb mechanisms, orientation and stereochemistry in elimination reaction, reactivity effect of structure, attacking and leaving group, competition between elimination and substitution, syn eliminations.

References:

1. Organic Chemistry–by J. Clayden, N. Greeves, S. Warren and P. Wothers (Oxford)
2. Advanced Organic Chemistry –by J. March 6^{th} Edition
3. Advanced Organic Chemistry (part A) –by A. Carey and R.J. Sundberg
4. Stereochemistry of carbon compound-by E.L. Eliel
5. Stereochemistry of organic compound-by Nasipuri
6. Guide book to Reaction Mechanism –Peter Sykes

General Chemistry

Semester – I

CHA-190 **(4 Credits, 48 L, 12 T)**

Safety in Chemical Laboratory and Good Laboratory Practices

1 History and importance of safety and health in Laboratory **(1 L)**

- Moral, legal and financial reasons.

2 Different types of Hazards at workplace handling chemicals **(3 L)**

- Physical, chemical, biological, allergens
- Effect of hazards on health
- Where to find Hazard information-Reading Labels,

Ref. 1; Page 1 – 8.

3 Personal Protective and other safety equipments and their uses **(6 L)**

Various safety goggles, types of gloves, apron, masks, different filters for masks, face shield, full body suit, safety shoes, helmet, breathing apparatus suit, safety belt, earmuffs along with inspection methods. Emergency exit, its location and approach path, fire extinguishers, and their periodic inspection, first aid kit, its contents and need for monitoring. Eye wash fountains and safety showers, fire drill, and chemical accident drills, accident free days and incentives to follow safety rules, accident recording and investigation for future controls

Ref. 2; relevant pages

Dos and Don't: Safe clothing, hair, dangling jewellery responsible attitude, good House Keeping, use proper PPE, No food in Labs. **(2 L)**

6 First Aid **(1 L)**

For contact of different chemicals on skin, eyes, and inhalation and ingestion

7 Types of fire extinguishers, method of use. **(1 L)**

8 Material Safety Data Sheets, Globally Harmonised System (GHS) Signs (hhtp://www.calstatela.ed/univ/ehs/msds.php) **(3 L)**

Importance and use of current 16 point format, Labels and pictograms and some of their discrepancies, Globally Harmonized System for SDS, label changes (2014)

9. Inventory Management, Storage and Disposal **(10 L)**

Inventory Management, Storage, Waste Classification, Hazardous Waste, Non-Hazardous Waste, mixed waste, Waste Disposal

10. What to do when things go wrong **(2 L)**

Spills, mercury spills, Injuries, Fires, building Evacuations, Emergencies

11. OSHA laboratory Standards **(2 L)**

Case studies: Reason for fire or accident, affixing responsibility and proposing action for prevention or minimizing possibility or severity **(6 L)**

Losses in an accident, Financial and non-financial, Importance of system based solutions over manual action, Economical solutions, Compromise between accident costs and prevention costs.

12. Good Laboratory Practices (GLP) **(12 L)**

Introduction and principles of GLP, performance of Lab studies and calibration using Standard Operating Procedures (SOPs), Instrument validation, reagent certification, Lab notebook maintenance to contemporary standards, maintenance of lab records based on instrument and reagent certification. Introduction to ISO and NABL accreditation.

Books:

1. Chemical Laboratory Safety and Security: A Guide to Prudent Chemical Management, Lisa Moran and Tina Masciangioli, Editors, THE NATIONAL ACADEMIES PRESS Washington, DCwww.nap.edu

2. Saftey in Academic Chemical Laboratory, Vol. II, ACS Publication, 7th Edition (2003).

3. OECD Series on Principles of Good Laboratory Practices and Compliance Monitoring, 1997.

4. Handbook of Good Laboratory Practices, TDR, WHO, UNICEF, UNDP (2009).

5. A Primer for Good Laboratory Practices and Good Manufacturing Practices, L. Huber, Agilent Technologies, 2002.

6. What went wrong By Trevor Kletz, Gulf professional Pubisher

Physical Chemistry

Semester – II

CHP-210: Fundamentals of Physical Chemistry-II (4 Credits)

SECTION-I (2 Credits, 24 L, 6 T)

Molecular Spectroscopy

1) Recapitulation:-Width and intensity of spectral transitions, Fourier transform, microwave spectroscopy, rotation spectra of di and ply atomic molecules, Stark effect (04 L)
2) Infra red spectroscopy : Harmonic and an harmonic oscillator, vibrational spectra of di – and poly- atomic molecules, coarse and fine structure, Nuclear spin effect, application, (05 L)
3) Raman Spectroscopy: Introduction, Rotational Raman- spectra, Vibrational Raman , Spectra, polarization of light and Raman effect, structure elucidation from combined Raman and IR spectroscopy, applications in structure elucidation. (05 L)
4) Electronic spectroscopy of molecules: Born – Oppenheimer approximation, electronic spectra of diatomic molecules, vibration, al coarse structure, rotational fine structure dissociation energy and dissociation products, electronic structure of diatomic molecules, molecular photoelectron spectroscopy, and application. (06 L)
5) ESR and Mossbauer spectroscopy applications. (02 L)
6) Principles of NMR – Chemical applications of PMR in structure elucidation. (02 L)

Reference:

Fundamentals of molecular spectroscopy: C.N. Banewell and E.Mc. Cash (Fourth edition).

SECTION-II (2 Credits, 24 L, 6 T)

Nuclear and Radiation Chemistry

1) Radio Chemistry : recapitulation – type of radioactive decay, Decay Kinetics, Detection & measurement of radiation (G.M. & Scintillation counter) (03 L)

2) Elements of radiation chemistry – Radiation chemistry, interaction of radiation with miller, passage of nucleolus through matter, interaction of radiation with matter, Units. for measuring radiation absorption, Radiation dosimetry, Radiolysis of water, free radiation in water Radiolysis, Radiolysis of some aqueous solution. (06 L)

3) Nuclear Reactor: - The fission energy, The Natural uranium reactor, the four factor formula- The reproduction factor K, the classification of reactor. Reactor power, Critical size of thermal reactor, excess reactivity & control, the Breeder reactor, The Indians nuclear energy programme, Reprocessing of spent fuel, Recovery of Uranium & Plutonium, Nuclear waste management, Natural nuclear reactor. (06 L)

4) Isotopes for nuclear reactors. Isotope separation, separation of selected isotopes, Plutonium. (03 L)

5) Applications of radioactivity: Typical reaction involved in preparation of radio isotopes: ^{3}H, ^{14}C, ^{22}Na ^{32}P ^{35}S, and I^{127} General principles of using radioisotopes. Physical constants – Diffusion coefficients, surface area, solubility. Analytical applications-neutron activation analysis, dilution analysis, radiometric titration. Industrial applications – radiation guaging, friction and wear out, gamma radiography. (06 L)

Reference Books

1. Elements of Nuclear chemistry – H.J. Arnikar, fourth edition wiley Estern Ltd.
2. Source book of atomic energy – S. Glasstanc, D. Van Norton Company
3. Chemical applications of radioisotopes – H.J. M. Brown Buffer & Jammer Ltd.

Inorganic Chemistry

Semester – II

CHI-230: Coordination and Bioinorganic Chemistry (4 Credits)

SECTION-I: Coordination Chemistry (2 Credits, 24 lectures, 6 T)

1. Concept & Scope of Ligand Fields, Free ion Configuration, Terms and States, Energy levels of transition metal ions, free ion terms, term wave functions, spin-orbits coupling. **(4 L)**

2. Ligand Field Theory of Coordination Complexes **(7 L)**
   Effect of ligand field on energy levels of transition metal ions, weak cubic ligand field effect on Russell- Saunders terms, strong field effect, correlation diagrams, Tanabe- Sugano Diagrams, Spin-Pairing energies.
3. Electronic spectra of Transition Metal Complexes **(7 L)**
   Introduction, Band intensities, band energies, band width & shapes, spectra of 1^{st}, 2^{nd} & 3rd row ions and rare earth ion complexes, spectrochemical & nephlauxetic series, charge transfer & luminescence, spectra, calculations of Dq, B, β parameters.
4. Magnetic Properties of Coordination Complexes **(6 L)**
   Origin magnetism, types of magnetism, Curie law, Curie-Weiss Law, Magnetic properties of complexes-paramagnetism 1st & 2nd Ordered Zeeman effect, quenching of orbital angular momentum by Ligand fields, Magnetic properties of A, E & T ground terms in complexes, spin free spin paired equilibria.

References:

1. Ligand field theory & its applications: B.N. Figgis & M.A. Hitachman (2000) Wiely VCH Publ.
2. Symmetry and spectroscopy of molecules, Second Ed^{n}, by K. Veera Reddy, New Age International Publication, 2009.
3. Elements of magnetochemistry, R. L. Datta and Syamal, Second Ed^{n}, Afiliated East West Press Pvt. Ltd. 2007.

Section-II: Bioinorganic Chemistry (2 Credits, 24 Lectures, 6 T)

1. Overviews of Bioniorganic Chemistry **(1 L)**
2. Principles of Coordination Chemistry related to Bioinorganic Research and Protein, Nucleic acids and other metal binding biomolecules. **(7 L)**
3. Biochemistry of Na, K and Ca w.r.t. Na/K pumps, Calmodulin and blood coagulation. **(8 L)**
4. Biochemistry of following elements:
   (a) Iron: Ferritin, Transferrin, Fe-S clusters, Porphyrin based systems **(6 L)**
   (b) Manganese: Photosynthesis **(2 L)**

Reference Books:

1. Principle of Bioinorganic Chemistry: S.J. Lippard and J,M. Berg
2. Bioinorganic Chemistry: Inroganic Elements in Chemistry of Life: W.Kaim and B. Schwederski
3. Bioinorganic Chemistry: Bertini, Gray, Lippard and Valentine
4. Bioinorganic Chemistry: R.J.P. Willams
5. Bioinorganic Chemistry: Robert Hay
6. Bioinorganic Chemistry: M.N. Hughes

Organic Chemistry

Semester – II

CHO-250: Synthetic organic chemistry and spectroscopy (4 Credits)

SECTION – I: Synthetic Organic Chemistry (2 Credits, 24 L, 6 T)

1. **Oxidation reactions:** **(6 L)**

   CrO_3, PDC, PCC, $KMnO_4$, MnO_2, Swern, SeO_2, $Pb(OAc)_4$, Pd-C, OsO_4, m-CPBA, O_3, $NaIO_4$, HIO_4

2. **Reduction reactions**: **(4 L)**

   Boranes and hydroboration reactions,

   MPV reduction and reduction with H_2/Pd-C, Willkinsons catalyst, DIBAL and Wolff Kishner reduction.

3. **Rearrangements:** **(6 L)**

   Beckmann, Hofmann,, Curtius, Smith, Wolff, Lossen, Bayer-villiger,

   Sommelet, Favorskii, Pinacol-pinacolone, Benzil-benzilic acid, Fries.

4. **Ylides:** **(4 L)**

   Phosphorus, Nitrogen and Sulphur ylides

5. **Addition to carbonyl group:** **(4 L)**

   Grignard, organo zinc, organo copper, organo lithium, reagents to carbonyl and unsaturated carbonyl compounds.

SECTION-II: Spectroscopy (2 Credits 24 Lectures, 6T)

a) UV: Factors affecting UV absorption and interpretation of UV spectra **(2 L)**

b) IR: Basic ideas about IR frequencies, interpretation of IR spectra **(4 L)**

c) PMR: Fundamentals of PMR, factors affecting chemical shift, integration coupling (1^{st} order analysis) **(8 L)**

d) Introduction to CMR and mass spectrometry **(4 L)**

e) Problems on UV, IR and PMR **(6 L)**

References:

1. Organic Chemistry – J. Clayden, N. Greeves, S. Warren and P. Wothers (Oxford)
2. Modern Synthetic reactions- H.O. House
3. Organic Synthesis – M.B. Smith
4. Advanced Organic Chemistry (part A & B)– A. Carey and R.J. Sundberg
5. Stereochemistry conformations and mechanism by P.S. Kalsi
6. Organic chemistry –by Cram, Hammond, Pine and Handrickson
7. Introduction to spectroscopy – D.l. Pavia, G.M. Lampman, G.S. Kriz, 3rd Edition
8. Spectroscopic methods in organic melecules – D.H. William & I Flemming Mc Graw Hill
9. Mechanism and Structure in Organic Chemistry - E.S. Gould

General Chemistry

Semester – II

CHA-290: General Chemistry – II

(Any two parts except B) (4 Credits)

PART-A: Modern Separation Methods and Hyphenated Techniques (2 Credits, 24 L, 6 T)

1. Mass Spectrometry (8 L)

Principle, Instrumentation, Ionization methods- Electron bombardment ionization, Arc and spark ionization, Photo-ionization, Thermal ionization, Chemical ionization, Mass analyzers- Magnetic, Double focusing, Time of flight, Quadrupolar, Ion cyclotron resonance analyzer, Correlation of mass spectra with molecular structure and molecular weight, Isotopic Abundances, Fragmentation patterns, Quantitative analysis, Applications and Problems. Fourier transform mass spectrometry, Tandem mass spectrometry, inductively coupled Plasma-mass spectrometry,

Ref. 1, Pages 647-696; Ref. 2, Pages 465-506

2. Gas Chromatography (8 L)

Theory and Instrumentation of GC, Sample injection- Split and splitless injection, Column types, Solid/Liquid Stationary phases, Column switching techniques, Basic and specialized detectors, elemental detection, chiral separations, , Gas chromatographs and chemical analysis, Interfacing of gas chromatography with mass spectrometry, Applications of GLC, Use of GC-MS ,High Speed gas chromatography, Gas- solid chromatography and problems,

Ref. 2, Pages 540-569; Ref. 3, Pages 125-143; Ref. 4, Pages 947-970.

3. High Performance Liquid Chromatography (HPLC) (8 L)

Theory and instrumentation of HPLC, Optimization of column performance, Gradient elution and related procedures, Derivatization, Mobile phase delivery system, sample injection, separation column, detectors, Interfacing HPLC with mass spectrometry, Structure types of

column packing, adsorption chromatography, Bonded phase chromatography, reverse phase chromatography, ion–pair chromatography, ion exchange chromatography, size exclusion chromatography, GC-MS and LC-MS, Applications and Problems.

Ref. 2: Pages 580-650, Ref. 4: Pages 974-992.

References:

1. Introduction to Instrumental Analysis, R. D. Braun, Mc Graw-Hill. Inc.1987.
2. Instrumental Methods of Chemical analysis, H. H. Willard, L. L. Merritt Jr., J. A. Dean & F. A. Settle Jr., 6th Edition, Wadsworth Publishing Company, USA,1986
3. Handbook of Instrumental Techniques for Analytical Chemistry, F. A. Settle editor, Prentice Hall Inc. A Simon and Schuster Company, New Jersey, 1997.
4. Fundamentals of Analytical Chemistry, D. A. Skoog, D. M. West, F. J. Holler, S. R. Crouch, 7th Edition, Thomson Asia Pte. Ltd, Singapore,2004

PART-B: (Compulsory for Drug Chemistry Students and Students from other disciplines also can opt for it)

Basic Biochemistry (4 Credits, 48 L, 12 T)

1. Introduction to Biochemistry: Scope of the subject in pharmaceutical sciences, Biochemical reactions, Highlights of prokaryotic and Eukaryotic cell metabolism.
2. Biochemical Morphology: Prokaryotes and Eukaryotes, Cell structure, sub-cellular components: Nucleus, plasma membranes, endoplasmic reticulum, Lysosome, Peroxisomes, Golgi apparatus, and Mitochondria.
3. Biomembrane: Structure, functions and composition, Model proposed , Function and properties of membrane, Transport hypothesis, Active and passive facilitated transport, Na+, K+, H+, pumps, glucose transport, Excitable membrane, drug transport.
4. Biomolecules:

   Proteins*:* Introduction, functional, classification of amino acids, classification, physicochemical properties, Optical activity, Reaction with ninhydrin, Formaldehyde,Aminoacids, Essential and non essential amino acids, efficacy, structure, peptide bond, end group analysis, Helix, B-sheet structure, tertiary, quaternary structure, globular protein, fibrous protein, amino acid therapy, Protein engineering

Carbohydrates: complex carbohydrate, structure of Chitin, Starch, Glycogen + Metabolism

Lipids: definition, classification, functions, types of fatty acids, and its biological role and metabolism.

5. Enzymes: Introduction, classification according to the reaction catalysis and source) structure of enzyme, co factures, active sites, Binding sites, Km, Vmax, Enzyme kinetics, Double reciprocal plot, effect of substrate, pH ionic strength, Concentration, Temperature on the rate of enzyme reactions, Enzyme inhibition(competitive, uncompetitive, non competitive and irreversible), Enzyme biotechnology. Manufacturing of medicinal compounds by enzymatic reactions, Penicillin acylase for the production 6-APA, Therapeutical uses of enzymes.

References:

1. Principals of biochemistry, Albert Lehninger (CBS Publisher and Distributers Pvt. Delhi.
2. Biochemistry Lubert Stryer, W. H. (Freeman and company New York)
3. Harper's Biochemistry by R.K. Murray, D. I. Granner, P. A. Mayes, (Prentice Hall International Inc.)
4. Practical Clinical Biochemistry, Harold Varley, (CBS Publisher and Distributers Pvt. Delhi.
5. Molecular Biology, J.D. Watson (The Benjamin/ Cumming Company, Inc.)

PART- C: Concept of Analytical Chemistry (2 Credits, 24 L, 6 T)

1. Data Handing and Spreadsheets in Analytical Chemistry (6 L)

Accuracy and Precision, classification of errors, Significant figures, rounding off, ways of expressing accuracy, Mean Deviation, Average Deviation, RMD, Standard Deviation Propagation of errors, Confidence limits, Tests of Significance, Rejection of results and Problems.

Ref. 2: Pages 65-99.

2. Sampling, Standardization and Calibration (8 L)

Analytical Samples and Methods of Sampling, Sample Handling, Gross sample, Preparation of Laboratory samples, Automated Sample Handling, Comparisons with standard and Numerical Problems.

Ref. 1: Pages 175-200.

3. Introduction to analytical separations (8 L)

Separation by precipitation, separation of species by distillation, separation by extraction, separation by ion exchange chromatography and problems.

Ref. 1: Pages 906-946

References:

1. Fundamentals of Analytical Chemistry, D. A. Skoog, D. M. West, F. J. Holler, S. R. Crouch, 5th Edition, Thomson Asia Pte. Ltd, Singapore, 2004.
2. Analytical Chemistry, G.D. Christian, 6 th Edition.

PART- D: Industrial Methods of Analysis (2 Credits, 24 L, 6 T)

1. Chemometrics: (10 L)

Concentration of solution based on volume and mass unit, calculations of ppm , ppb and dilution of the solutions , Concept of mmole, Stoichiometry of chemical reactions, Concept of gmole, Limiting reactants, theoretical and practical yield, solubility and solubility equilibria. Concept of formation constant, Stability and instability constants, stepwise formation constants and Numerical problems.

2. Quality in Analytical Chemistry (6 L)

Quality systems in chemical laboratories, cost and benefits of quality system, types of quality standards for laboratories, total quality management, quality audits, and qualities reviews , responsibility of laboratory staff for quality and problems.

3. Process Instruments and Automated Analysis (8 L)

Introduction, industrial process analyzer, methods based on bulk properties, continuous online process control, automatic chemical analyzers, automatic elemental analyzers, Numerical problems.

R**ef 3: Pages: 786-828.**

References:

1. Vogel's Text book of Quantitative Analysis.
2. Analytical Chemistry, G.D. Christian, 6 th Edition.
3. Instrumental Methods of Chemical analysis, H. H. Willard, L. L. Merritt Jr., J. A. Dean & F. A. Settle Jr., 6th Edition, Wadsworth Publishing Company, USA,1986

PART- E: Organometallic and Inorganic Reaction Mechanism (2 Credits, 24 L, 6 T)

(Recommended for M. Sc. other than Inorganic specialization)

1) Organometallic Chemistry (8 L)

Organic ligands and nomenclature, 18 electron rule: counting electrons, ligands having extended pi system, bonding between Metal Atoms and organic pi systems: linear pi system, cyclic pi system, **s**pectral analysis and characterization of organometallic complexes: IR and NMR, examples.

2) Organometallic Reactions and Catalysis (8 L)

Reactions involving gain and loss of ligands: ligand dissociation and substitution, oxidative addition, reductive elimination, nucleophelic displacement, **r**eactions involving modification of ligands: insertion, carbonyl insertion, 1-2 insertion, hydride elimination, abstraction, organometallic catalysis: Hydroformylation, Monsanto acetic acid process, Wacker Process, Hydrognation by Willkinsons catalyst, Olefin metathesis, heterogeneous catalysis: Ziegler Natta Polymerization, Water gas reduction.

3) Coordination Compounds: Reactions and Mechanism (8L)

History and principles, Substitution reactions: Inert and labile complexes, mechanism of substitution, Kinetics Consequences of reaction pathway: dissociation, interchange, association, Experimental evidences in Octahedral Substitution: dissociation, linear free energy relationship, associative mechanism, the conjugate base mechanism, the kinetic chelate effect, Stereochemistry of reactions: substitution in trans complexes, substitution in cis complexes, isomerisation of chelate rings, substitution reactions in Sq. Pl. Complexes.

Reference Book:

Inorganic Chemistry: Gary Miessler and Donald A. Tarr, Third Ed., Pearson (Chapter-12, 13 and 14 pages: 422 to 561)

Part F: Mathematics for Chemists (2 Credit; 24 L, 6 T)

(Recommended for M. Sc. other than Physical Chemistry specialization)

1. Functions: Differential and integral calculus, limits, derivatives, physical significance, basic rules of differentiation, maxima and minima, application is chemistry, exact and inexact differentiation, Taylor & McLaurin Theorem, curve sketching, partial differentiation, rules of integration, separation of variable, substitution, partial function method to solve to indefinite integrals in chemistry. **(14 L)**
2. Differential Equations: Separation of variables, homogeneous, exact, linear equations of second order, series solution method. **(6 L)**
3. Vectors Matrices, and Determinants: **(4 L)**

   Vectors, dot, Corss and triple products, introduction to matrix algebra, addition and multiplication of matrices, inverse, adjoins and transport of matrices, unit and diagonal matrices.

References:

1) Chemical Maths Book, E. Steiner, Oxford University Press (1996).
2) Mats For Chemists Vol 1 and 2, Martin MCR Cockett and G. Doggett, Cambridge (2003).
3) Mathematical Preparation for Physical Chemistry, F. Daniels, McGraw Hill (1972)

Part G: Pericyclic reactions, Photochemistry and Free radicals (2 Credit; 24 L, 6 T)

(Recommended for M. Sc. other than Organic Chemistry specialization)

1. **Pericyclic reactions** **(10 L)**

   Electrocyclisation, cycloaddition, sigmatropic and Alder-ene reactions. Analysis of pericyclic reactions by construction of correlation diagrams and by FMO approach.
2. **Free radicals** **(6 L)**

   Generation, stability and general reactions like displacement, addition and rearrangements.

3. **Photochemistry** **(8 L)**

   Basic concepts in Photochemistry, Jablonski diagram, quenching, triplet excitation, photosensitization, quantum yield, photochemistry of carbonyl compounds (photoreduction, photoenolization, Norrish type I and II) and benzene derivatives.

References:

1. Conversation of orbital symmetry – Woodward and Hoffmann
2. Organic Chemistry – Morrison and Boyd
3. Organic Chemistry – Warren, Clayden, Greeves and Wothers
4. Advanced Organic Chemistry – Carey, Sandburg Vol. A.
5. Organic reactions and Orbital Symmetry - T. L. Gilchrist and R. C. Storr
6. Excited states in Organic Chemistry – J. D. Coyle and J. A. Barltrop
7. Orbital Symmetry – A problem solving approach. R. F. Lehr and A. P. Marchand
8. Principles of Organic Synthesis – Norman, Coxon

M.Sc.-I: Practical

CHP-107: Physical Chemistry Practicals (6 Credits)

A) Conductometry: (Any four)

1. Study the Hydrolysis of NH_4Cl or CH_3COONa or aniline hydrochloride.

2. Determination of equivalent conductance at infinite dilution and dissociation constant of acetic acid.

3. Study the second order velocity constant of the hydrolysis of ethyl acetate by sodium hydroxide.

4. Determination of ΔG, ΔH, and ΔS of silver benzoate by conductometry.

5. Determination of critical micellar concentration (CMC) and ΔG of micellization of sodium dodecyl sulphate (SDS).

6. Determination of concentrations of strong acid and weak acid present in the mixture by titration with strong base.

B) Potentiomerty: (Any four)

1. Determination of stability Constant of a complex ion.

2. Determination of Solubility and solubility product of a sparingly soluble salt.

3. Estimation of amount of halides present in the mixture.

4. Determination of concentrations of strong acid and weak acid present in the mixture by titrating with strong base.

5. Determination of concentrations of reductant or oxidant by redox titration.

C) pH metry: (Any two)

1. Determination of the acid and base dissociation constant of an amino acid and hence the isoelectric point of the acid.

2. Determination of dissociation constants of tribasic acid (phosphoric acid)

3. Determination of Hammett constant of o-, m-, p- amino/nitro benzoic acid.

D) Polarography:

1. Determination of half wave potential ($E_{1/2}$) and unknown concentration of an ion.

2. Amperometric titration of $Pb(NO_3)_2$ with $K_2Cr_2O_7$.

E) Colorimetry/Spectrophotometry: (Any two)

1. Simultaneous determination of cations from the mixture.

2. Determination of amount of copper by photometric titration with EDTA.

3. Study the kinetics of iodination of acetone spectrophtometrically.

F) Radioactivity: (Any two)

1. Estimation of Manganese in tea leaves by Neutron Activation Analysis.

2. Determination of half-life of a radioactive nuclide and counting errors.

3. Determination of E_{max} of β radiation and absorption coefficients in Al.

G) Chemical Kinetics: (Any three)

1. Study of Kinetic decomposition of diacetone alcohol by dilatometry.

2. Determination of individual orders of iodide and persulphate ions and overall order of oxidation reaction of iodide ion by persulphate ion.

3. Investigation of influence of ionic strength on rate constant (Brönsted primary salt effect).

4. Determination of temperature coefficient and energy of activation of acid catalyzed ester hydrolysis reaction.

H) Non-Instrumental: (Any five)

1) Determination of surface excess of amyl alcohol or TX-100 surfactant by Capillary rise method.

2) Statistical treatment of experimental data.

3) Determination of molecular weight by steam distillation.

4) Determination of glycerol radius by viscosity.

5) Determination of partial Molar Volume (Polynometry) and the densities of a series of solutions and to calculate the molar volumes of the components.

6) Analysis of crystal structure from single crystal X-ray pattern.

References:

1. Practical physical chemistry, A. Findlay, T.A. Kitchner (Longmans, Green and Co.)

2. Experiments in Physical Chemistry, J.M. Wilson, K.J. Newcombe, A.r. Denko. R.M.W. Richett (Pergamon Press)

3. Senior Practical Physical Chemistry, B.D. Khosla and V.S. Garg (R. Chand and Co., Delhi.).

4. Experimental Physical Chemistry by D. P. Shoemaker, Mc. Growhill, 7th Edition, 2003.

5. Physical chemistry by Wien (2001)

6. Practical physical chemistry, B. Vishwanathan and P.S. Raghavan, 2nd edition, (2012)

7. Experimental Physical chemistry, V.D. Athawale, Parul Mathur, New age International publishers.

CHI-107: Inorganic Chemistry Practical (6 Credits)

Part-I: Ore analysis (Any Two) (Ref. -1)

a. Analysis of Pyrolusite ore.
   Determination of (i) Silica and (ii) Manganese

b. Analysis of Chalcopyrite ore.
   Determination of (i) Copper and (ii) Iron

c. Analysis of hematite ore.
   Determination of (i) Silica and (ii) Iron

Part-II: Alloy Analysis (Any Two) (Ref. -1)

a. Determination of tin and lead from solder.

b. Determination of iron and chromium from mild steel.

c. Determination of copper and nickel from cupronickel.

Part-III: Inorganic Synthesis and Purity (Any five) **(Ref. – 2)**

Part A: Five preparations

Part B; Purity determination of above preparations

a. $Mn(acac)_3$

b. Chloro penta-ammine cobalt (III) chloride

c. Nitro penta-amminecobalt (III) chloride

d. Nitrito penta-amine cobalt (III) Chloride.

e. Potassium tri-oxalato aluminate

f. Tris(ethylene di ammine) Ni(II) thiosulphate.

e. Bis[TrisCu(I)thiourea]

Part-IV: Ion – exchange chromatography (Any one experiment) **(Ref. -1 and 3)**

a) Separation of mixture of Zn(II) and Cd(II) using Amberlite IRA 400 anion exchanger and quantitative estimation of separated ions Zn(II) and Cd(II)

b) Separation of mixture of Zn(II) and Mg(II) using Amberlite IRA 400 anion exchanger and quantitative estimation of separated ions Zn(II) and Mg(II)

Part-V: Spectrophotometry (all two experiments)

a. Estimation of phosphate from waste water by calibration curve method **(Ref. -4)**

b. Determination of equilibrium constant of M – L systems Fe (III) – Salicylic acid or Fe(III)–Sulphosalicylic acid or Fe(III)–β–resorcilic acid by Job's continuous variation method. (Ref.-3)

c. Determination of iron by solvent extraction techniques in a mixture of Fe(III) +AL(III) or Fe(III) + Ni(III) using 8–hydroxyquinoline reagent.
(Ref. -1)

or

c) Determination of Cu(II) by solvent extraction as Dithiocarbamate/8-Hydroxyquinoline complex (Ref-1,3)

Part-VI: Inorganic characterization techniques (any one of the following)

a. Solution state preparation of $[Ni(en)_3]S_2O_3$, $[Ni(H_2O)_6]Cl_2$, $[Ni(NH_3)_6]Cl_2$. Record absorption spectra in solution of all three complexes and analyse it. Arrange three ligands according to their increasing strength depending on your observations. (Ref. -5)

b. Determination of magnetic susptibility (χ_g and χ_m) of mercury tetracyanato cobalt or $Fe(acac)_3$ or Ferrous ammonium sulfate by Faraday or Gouy method. **(Ref. -3)**

Part-VII: Synthesis of Nanomaterials (any one of the following)

a) Synthesis of nano size ZnO, its characterization by UV-Visible spectroscopy and removal of dye by ZnO-photocatalysis **(Ref-2)**

b) Synthesis of nano size α-Fe_2O_3 and study of adsorption of phosphate on it **(Ref-2)**

Part-VIII: Conductometry (any one of the following).

a) Verification of Debye Huckle theory of ionic conductance for strong electrolytes KCl,$BaCl_2$ K_2SO_4, $K_3[Fe(CN)_6]$ (Ref. -3)

b) Structural determination of metal complexes by conductometric measurement. **(Ref-3)**

c) To study complex formation between Fe(III) with sulfosalicylic acid by conductometry (Ref-3).

Part-IX: (any one of the following)

a) Synthesis and photochemistry of $K_3[Fe(C_2O_4)_3]$ $3H_2O$. **(Ref-4)**

b) Kinetics of substitution reaction of $[Fe(Phen)_3]^{2+}$ **(Ref-3)**

Part-X: Table work

a) Data analysis, error analysis, least squares method. **(Ref-3)**

Reference Books:

1) Text book of Quantitative Analysis, A.I. Vogel 4^{th} Edn. (1992).
2) Experimental Inorganic Chemistry, Mounir A. Malati, Horwood Series in Chemical Science (Horwood publishing, Chichester) 1999.
3) Experiments in Chemistry, D. V. Jahagirdar, Himalaya Publishing House
4) General Chemistry Experiments, Anil. J Elias, University press (2002)
5) Ligand Field Theory, B. N. Figgis.

CHO-247: Organic Chemistry Practical (6 Credits)

Use of chemistry software like MOPAC, ISIS draw, Chem office (Minimum 3 experiments)

Purification techniques (any 5)

Purification of solvents and reagents using techniques like crystallization, distillation, steam distillation, vacuum distillation, drying and storage of solvents, sublimation etc.

a) Chromatography: TLC, Column.

b) Solvent extraction using soxhlet extractor

1. **Three component mixture separation and analysis using ether**.

(8 mixtures minimum including amino acid)

2. **Single stage preparations (minimum 8 preparations)**

a) 2-Methoxy naphthalene to 1-formyl-2- methoxy naphthalene

b) Toluene to 4-methyl acetophenone

c) Anthranilic acid to 2-iodo /2-choro benzoic acid

d) Cyclohexanol to cyclohexanone

e) Benzophenone to diphenyl methane

f) Benzyl cyanide to phenyl acetic acid

g) Benzaldehyde to chalcone

h) Gycine to Benzoylglycine

i) Nitrobenzene to m-di-nitrobenzene

j) m-di-nitrobenzene to m-nitroaniline

k) Benzoic acid to ethylbenzoate

l) Diel's Alder reaction of anthracene and maleic anhydride

m) Chlorobenzene to 2,4-dintro chlorobenzene

Reference books

n) 1. Textbook of practical organic chemistry – A.I. Vogel

M.Sc. Drug Chemistry

Practical

CHD-128: INORGANIC AND ANALYTICAL CHEMISTRY PRACTICALS

(6 Credits)

1. Inorganic synthesis and characterization by physical or chemical methods:
   a) Cis-trans potassium diaquo dioxalate chromate (III)
   b) Chloropentammino cobalt (III) chloride.
2. Colorimetry;
   Keg of M-L systems such as:
   i) Fe (III) Salicylic acid
   ii) Fe (III) Sulphosalicylic acid
   iii) Fe (III) resorcilic acid by Job's method and Mole ratio method
3. Photometric titration of systems such as:
   a) Cu^{2+} - EDTA
   b) Fe^{2+} - Sulphosalicylic acid
   c) Co^{2+} - R-nitroso salt.
4. Potentiometry:
   a) Complexometric determination using disodium EDTA of
   i) Co^{2+}
   jj) Al^{3+}
   iii) Cu^{2+}
5 Solvent extraction of Al / Mo usmg 8-hydroxy quinoline complex and determination by spectrophotometry
6. Solvent extraction of ferric thiocyanate complex and determination by colorimetry.
7. Separation and estimation of Fe and Al on a cation exchanger.
8. Separation and estimation of copper and cobalt on cellulose column.
9. Analysis of Vitamin C in juices and squashes.
10. Analysis of Vitamin A in food products.
11. Simultaneous determination by titanium and vanadium Pt and Pd using hydrogen peroxide by spectrophotometry.

12, Estimation of Na, K and Ca in binary mixture by flame photometry using Li as Internal standard and using standard addition method.

13. Determination of the strength of the following by fiourimetmy, beryllium, aluminium, vitamin B1, vitamin B2.

14. Determination of the strength of commercial phosphoric acid/vinegar by conductometric titration.

15. Analysis of malathion by colorimetry or polarography.

16. Estimation of nitrile, fluoride, dissolved chlorine, chloride, iron, chromium, manganese colorimetrically.

17. Estimation of Hg, Pb, Cd spectrophotometrically/complexometrically.

18. Estimation of sulphadizine.

19. Estimation of mixtures of benzoic acid and salicylic acid in pharmaceutical preparations

20. Determination of iron, calcium and phosphorous in milk powder.

21. Partition coefficient.

References:

1) A textbook of Qualitative Inorganic Analysis3rd Edn., A. I Vogel, ELBS.

2) A Textbook of Practical Organic Chemistry, 4th Edn., A. I. Vogel, ELBS.

3) Standard Methods of Chemical Analysis, 6th Edn.; A series of volumes edited by F. J. Weicher, Robert E. Krieger Publishing co.

4) Pharmacoepoeia of India.

CHD-108: Practical Course in Separation, Purification & Analytical techniques in Drug Chemistry **(5 Credits)**

1. Purification of solvents and reagents

2. Mixture separation Two and Three components.

3. Isolation of Natural products from Clove, Cinnamom by steam distillation. Also use Soxhlet apparatus for one natural product.

4. Chromatographic techniques as TLC, Coloumn chromatography

5. Biomolecule separation and identification using Gel Electrophoresis, Paper chromatography Immunoelectrophoresis.

6. Separation and Identification of active drug ingredients from commercial pharmaceutical preparations.
7. Try to use spectral data whenever possible.
8. Any current techniques as per need and demand.

CHD-248: ORGANIC CHEMISTRY PRACTICALS **(5 Credits)**

1. Techniques: Crystallization, fractional crystallisation, fractional distillation, vacuum distillation, sublimation, steam distillation.
2. Single stage preparation involving different type of reactions (minimum 8 preparations).
3. Two-stage preparations (mininim 2 preparation).
4. Three-stage preparations (minimum 2 preparations).
5. Derivatives of functional groups such as acetyl, benzoyl, 2, 4-DNP, oxime, anilide, amide and aryloxy acetic acid (minimum one of each type)

Typical preparations from which the single and two stage preparations can be chosen are:

1. Toluene — p-nitrotoluene — p-nitrobenzoic acid — p-amino benzoic acid
2. Benzene — Acetopheneone — Acetophenone oxime — Acetanilide
3. Benzaldehyde — Benzoin — Benzil — Benzillic acid
4. Nitrobenzene — m-dinitrobenzene — m-nitroaniline — m-nitrophenol
5. Phthalic acid — phthalic anhydride – phthalimide — Anthranilic acid
6. Anthranilic acid — pheylglycine — orthocarboxylic acid — indigo
7. Acetophenone — Benzalacetophenone — epoxide
8. Cyclohexanone —Cyclohexanone oxime—caprolactam
9. Phthalic anhydride—o-benzolylbenzoic acid—anthraquinone.
10. O-Cholobenzoinc acid —N-phenylanthranilic acid —acridone.
11. Cholrobenzene—2,4-dinitrochlorobenzene —2,4-dinitrophenol
12. Bromobenzene—triphenylcarbinol-tritylchloride
13 Resorcinol—resacetophenone — 4-ethyl resorcinol
14. Phenol—allylphenyl ether—o-allylphenol
15. Phenol —salicylaldehyde—coumarin

UNIVERSITY OF PUNE

Revised Course Structure of English

F. Y. B. A. Compulsory English (w. e. f- 2013-2014)

Prescribed Text: *Visionary Gleam: A Selection of Prose and Poetry* (Board of Editors- Orient Blackswan)

Objectives

a) To familiarize students with excellent pieces of prose and poetry in English so that they realize the beauty and communicative power of English

b) To expose them to native cultural experiences and situations in order to develop humane values and social awareness

c) To develop overall linguistic competence and communicative skills of the students

Term-I	Term-II
Prose- 1, 2, 3, 4	**Prose- 5, 6, 7, 8**
Poetry- 9, 10, 11	**Poetry- 12, 13, 14**
Grammar- 1, 2, 3	**Grammar- 4, 5**
Communication Skills- 1,2,3,4,5	**Communication Skills- 6,7,8,9,10**

Prose

1. **An Astrologer's Day-** R.K Narayan
2. **Our Urgent Need of Self-esteem**-Nathaniel Branden
3. **The Gift of Magi-** O' Henry
4. **Karma**-Khushwant Singh
5. **Tryst with Destiny**-Jawaharlal Nehru
6. **Youth and the Tasks Ahead**-Karan Singh
7. **Prospects of Democracy in India**-B. R. Ambedkar
8. **The Eyes are not Here**-Ruskin Bond

Poetry

9. **A Red, Red Rose-** Robert Burns
10. **Where the Mind is without Fear**- Rabindranath Tagore
11. **If You Call Me-** Sarojini Naidu
12. **Upon Westminster Bridge-** William Wordsworth
13. **An old Woman**- Arun Kolatkar
14. **Success is Counted Sweetest**- Emily Dickinson

Grammar and Communication Skills

Grammar:

1. Articles

2. Prepositions

3. Verbs

3.1 Regular and Irregular Verbs

3.2 Auxiliaries (Primary and Modal)

4. Tenses

4.1 Present tense- A) Simple present, B) Present progressive, C) Present perfect, D) Present perfect progressive

4.2 Past tense- A) Simple past, B) Past progressive, C) Past perfect, D) Past perfect progressive

4.3 Future tense- - A) Simple future, B) future progressive, C) Future perfect, D) Future perfect progressive

5. Subject-Verb Agreement (Concord)

Communication skills:

1. Taking Leave

2. Introducing Yourself

3. Introducing People to One Another

4. Making Requests and Asking for Directions

5. Making and Accepting an Apology

6**. Inviting and Accepting/Declining an Invitation**

7. Making a Complaint

8. Congratulating, Expressing Sympathy and Offering Condolences

9. Making Suggestions, Offering Advice and Persuading

10. Expressing Agreement/Disagreement and Seeking Clarification

Question paper pattern of the course will be given in due course of time

F. Y. B. A. Optional English (General Paper-I) (w. e. f- 2013-2014)

Prescribed Text: *Interface: English Literature and Language* (Board of Editors- Orient Blackswan)

Objectives

a) To expose students to the basics of literature and language

b) To familiarize them with different types of literature in English, the literary devices and terms so that they understand the literary merit, beauty and creative use of language

c) To introduce the basic units of language so that they become aware of the technical aspects and their practical usage

d) To prepare students to go for detailed study and understanding of literature and language

e) To develop integrated view about language and literature in them

Term-I

Prose

1. **A Lesson My Father Taught Me**- A.P.J. Abdul Kalam

2. **Toasted English**- R. K. Narayan

Short Stories

1. **The Romance of a Busy Broker-** O. Henry

2. **A Day's Wait**- Ernest Hemingway

Poetry

1. **Sonnet 29: 'When in disgrace with Fortune and men's eyes'**- William Shakespeare

2. **The World is too much with us**- William Wordsworth

3. **The Listeners-** Walter de la Mare

4. **No Men are Foreign**- James Kirkup

Language studies-I

1. **Characteristics of Human Language**

2. Functions of Language

Term-II

Short Stories

1. **Upper Division Love-** Manohar Malgaonkar

2. **Marriage is a Private Affair-** Chinua Achebe

Poetry

1. **The Road Not Taken**- Robert Frost

2. **The Sun Rising-** John Donne

3. **The Mountain and the Squirrel-** R. W. Emerson

4. **Ballad of the Landlord-** Langston Hughes

One Act Plays

1. **Lithuania-** Rupert Brooke

2. **Swansong -** Anton Chekhov

Language studies-II

1. **Aspects of Language and Branches of Linguistics**

2. Introduction to the Sounds of English

Question paper patterns of the course will be given in due course of time.

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Revised Course Structure of English

S. Y. B. A. Compulsory English (w. e. f- 2014- 2015)

(1) Objectives

1. To develop competence among the students for self-learning
2. To familiarize students with excellent pieces of prose and poetry in English so that they realize the beauty and communicative power of English
3. To develop students' interest in reading literary pieces
4. To expose them to native cultural experiences and situations in order to develop humane values and social awareness
5. To develop overall linguistic competence and communicative skills of the students

(2) Course Content

Prescribed Text: ***Literary Landscapes*** **(**Ed. Board of Editors, Orient Blackswan)

Literature Components

1. Playing the English Gentleman- *Mohandas Karamchand Gandhi*
2. The Homecoming- *Rabindranath Tagore*
3. A Letter by Hazlitt to His Son- *William Hazlitt*
4. Freedom of the Press- *Shashi Tharoor*
5. A Cup of Tea- *Katherine Mansfield*
6. The Last Leaf- *William Sydney Porter*
7. Kalpana Chawla
8. My Lost Dollar- *Stephen Leacock*
9. The Quality of Mercy- *William Shakespeare*
10. The Village Schoolmaster- *Oliver Goldsmith*
11. The Solitary Reaper- *William Wordsworth*
12. O Captain! My Captain!- *Walt Whitman*
13. Laugh and Be Merry- *John Masefield*
14. Still I Rise- *Maya Angelou*
15. Another Woman- *Imtiaz Dharker*
16. My Grandmother's House- *Kamala Suraiyya Das*

Language Components

1. **Vocabulary**
-Introduction
-Collocations: Words that go together
-Phrasal verbs
-Commonly confused words
-One-word substitutes
-Idioms

2. **Grammar**
-The passive voice
-Direct and indirect speech
-Negative sentences
-Question tags
-Simple, compound and complex sentences

3. Written Communication
-Paragraph writing
-Report writing
-Letter writing

Term-wise division of the syllabus:

Term-I

Literature components

Unit – 1 to 4 and 9 to 12

Language components

1. Vocabulary

2. Grammar
(*The passive voice* and
Direct and indirect speech only)

Term-II

Literature components

Unit – 5 to 8 and 13 to 16

Language components

2. Grammar: *(Negative sentences, Question Tags, Simple, compound and complex sentences only)*
3. Written Communication

Question Paper Pattern (Term-End Exam)

Time:- Two Hours **Total Marks:- 60**

Q 1. Attempt any One from (A) and One from (B) in about 100 words each
(Questions on prose units 01 and 02) Marks 12
Q 2. Attempt any One from (A) and One from (B) in about 100 words each
(Questions on prose units 03 and 04) Marks 12
Q 3. Attempt any One from (A) and One from (B) in about 100 words each Marks 12
(Questions on unit no 9,10,11,12)
Q 4. Refer to the context **(any three)** Marks 12
(Unit no 9,10,11,12)
Q5. A) Questions on Vocabulary **(any eight)** Marks 08
B) Questions on Grammar (Passive voice, Direct/Indirect speech) **(any Four)** Marks 04

(Questions should be based on the exercises given at the end of each unit of the prescribed textbook)

Question Paper Pattern (Annual Exam)

Time:- Three Hours **Total Marks:- 80**

Q 1. Attempt any One from (A) and One from (B) in about 150 words each
(Questions on prose units 01 to 04- First term) Marks 16
Q 2. Attempt any One from (A) and One from (B) in about 150 words each
(Questions on poetry units 09 to 12- First term) Marks 16
Q. 3) Attempt any One from (A) and One from (B) in about 150 words each

(Questions on prose unit no. 5 to 8 of the second term) Marks 16

Q. 4) Attempt any One from (A) and One from (B) in about 150 words each

(Questions on poetry unit no. 13 to 16 of the second term) Marks 16
Q5. A) Questions on Grammar (excluding first term items) (Any six) Marks 06
B) Written communication (Any two) Marks 10

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Revised Course Structure of English

S. Y. B. A. General English (G-2) (w. e. f- 2014- 2015)

Title of the Paper: Study of English Language and Literature

(1) Objectives:

a) To expose students to the basics of short story, one of the literary forms
b) To familiarize them with different types of short stories in English
c) To make them understand the literary merit, beauty and creative use of language
d) To introduce some advanced units of language so that they become aware of the technical aspects and their practical usage
d) To prepare students to go for detailed study and understanding of literature and language
e) To develop integrated view about language and literature in them

(2) Course content:

Prescribed Texts: 1) ***Rainbow: A Collection of Short Stories***
Ed. Board of Editors, Orient Blackswan
2) ***Linguistics: An Introduction***
Ed. Board of Editors, Orient Blackswan

1) Rainbow: A Collection of Short Stories

Introduction
What is literature?
Examining some literary devices
Plato and mimesis
Components of a literary piece and approaches to literature
Elements of the short story
Short story: A short history
Short story: The genre

1. The Three Questions- *Lev Nikolayevich Tolstoy*
2. Mother of a Traitor- *Maxim Gorky*
3. The Bet- *Anton Chekhov*
4. My Uncle Jules- *Guy de Maupassant*
5. The Bottle Imp- *R. L. Stevenson*
6. After Twenty Years- *O. Henry*
7. Lawley Road- *R. K. Narayan*
8. The Open Window- *Hector Hugh Munro*
9. Kabuliwallah- *Rabindranath Tagore*

10. A Signal Man- *Charles Dickenson*

2) *Linguistics: An Introduction* (Only Part – I Prescribed for SYBA General English)

1. **Phonology:**
   -Organs of speech, speech mechanisms,
   -Description and classification of consonants and vowels,
   -Concept of syllable,
   -Word accent, sentence accent,
   -Tone groups, placement of nuclear/tonic accent,
   -Concept of intonation, uses/types of tones

2. **Morphology:**
   -What is morphology?
   -Concept of morpheme, allomorph, zero allomorph, types of morphemes (free and -bound), Prefixes and Suffixes (class-changing and class-maintaining),
   -Inflectional and Derivational suffixes

3. **Sociolinguistics:**
   -National varieties of English: British, American and Indian
   -Regional and social dialects, standard dialect, concept of register, formal and informal styles
   -Pidgins and Creoles, code-switching and code mixing, borrowings

Term-wise division of the syllabus:

Term-I

1. Introduction (to the form of Short Story etc.)
2. Stories from-**Rainbow : 01 to 05**
3. Phonology part from- **Linguistics: An Introduction**

Term-II

1. Stories from- **Rainbow : 06 to 10**
2. Morphology part from- **Linguistics: An Introduction**
3. Sociolinguistics part from- **Linguistics: An Introduction**

Question Paper Pattern (Term-End Exam)

Time: Two Hours **Total Marks: 60**

Q. 1) Attempt any 2 out of 4 questions in about 100 words each
(Questions on Introduction to the **form of Short Story**) Marks 12
Q. 2) Attempt any 2 out of 4 questions in about 100 words each
(Questions on **Short Stories prescribed** for the First term) Marks 12
Q. 3) Attempt any 2 out of 4 questions in about 100 words each
(Questions on **Short Stories prescribed** for the First term) Marks 12
Q. 4) A) Write short notes on the following (Any 2 out of 4)
(Questions on **Phonolgy part, prescribed** for the Ist term) Marks 12
Q.5) Practical/objective questions on **Phonolgy prescribed** in the Ist term as under:
A) Transcribe the following words according to RP (4 out of 6) Marks 04
(Only monosyllabic/disyllabic words to be given for transcription)
B) Fill in the blanks (4 out of 6) Marks 04
C) Do as directed (4 out of 6) Marks 04
(Practical questions like : Identifying, Giving examples, Placing word accent, Showing tone group division etc can be asked in this section)

Question Paper Pattern (Annual Exam)

Time:- Three Hours **Total Marks:- 80**

Q. 1) A) Attempt any 1 out of 2 questions in about 100 words each
(Questions on Introduction to the **form of Short Story**) Marks 08
B) Attempt any 1 out of 2 questions in about 100 words each
(Questions on **Short Stories prescribed** for the Ist term Marks 08
Q. 2) Short notes on any 4 out of 6 questions in about 100 words each
(Questions on **Phonolgy part, prescribed** for the Ist term) Marks 16
Q. 3) Attempt any 2 out of 4 questions in about 100 words each
(Questions on **Short Stories prescribed** for the IInd term) Marks 16
Q. 4) Attempt any 2 out of 4 questions in about 100 words each
(Questions on **Morphology** prescribed in the IInd term) Marks 16
Q.5) Attempt any 2 out of 4 questions in about 100 words each
(Questions on **Sociolinguistics** prescribed in the IInd term) Marks 16

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Revised Course Structure of English

S. Y. B. A. Special Paper-I (S-1) (w. e. f- 2014- 2015)

Title of the Paper: Appreciating Drama

(1)Objectives:

1. To acquaint and familiarize the students with the terminology in Drama Criticism (i.e. the terms used in Critical Analysis and Appreciation of Drama)
2. To encourage students to make a detailed study of a few sample masterpieces of English Drama from different parts of the world
3. To develop interest among the students to appreciate and analyze drama independently
4. To enhance students awareness in the aesthetics of Drama and to empower them to evaluate drama independently

(2) Course content:

A) Theory of Drama

(a) What is Drama?
(b) Elements of Drama: Theme, Characters, Plot, Dialogue, Stage Properties, The Three Unities, Conflict, Elements of Structure
(c) Types of Drama: Tragedy, Comedy, Tragi-Comedy, Problem Plays, Absurd Drama
(d) In addition, other terms related to Drama be considered for background study

B) Texts: 1) ***The Merchant of Venice*****-** William Shakespeare
2) ***A Doll's House*****-** Henrik Ibsen
3) ***The Old Stone Mansion*****-** Mahesh Elkunchwar

Term-wise division of the syllabus:

Term-I- A. **Theory of Drama**
B. Text-1) ***The Merchant of Venice*****-** William Shakespeare

Term-II- Texts: 2) ***A Doll's House*****-** Henrik Ibsen
3) ***The Old Stone Mansion***- Mahesh Elkunchwar

Question Paper Pattern (Term-End Exam)

Time:- Two Hours **Total Marks:- 60**

Q.1) Questions on the theory of drama. (3 out of 5) Marks 12
Q.2) Questions on the theory of drama. (3 out of 5) Marks 12
Q.3) Questions on 'The Merchant of Venice'. (1 out of 2) Marks 12
Q.4) Questions on 'The Merchant of Venice'. (2 out of 3) Marks 12
Q.5) Practical questions on the application of theory of the drama prescribed (4 out of 6) Marks 12

Question Paper Pattern (Annual Exam)

Time:- Three Hours **Total Marks:- 80**

Q.1) Questions on the theory of drama. (4 out of 6) Marks 16
Q.2) Questions on 'The Merchant of Venice'. (1 out of 2) Marks 16
Q.3) Questions on 'A Doll's House'. (2 out of 3) Marks 16
Q.4) Questions on 'The Old Stone Mansion'. (2 out of 3) Marks 16
Q 5 Practical questions on the application of theory of the drama prescribed (8 out of 10) Marks 16

UNIVERSITY OF PUNE

Revised Course Structure of English

S. Y. B. A Special Paper-II (S-2) (w. e. f- 2014- 2015)

Title of the Paper: Appreciating Poetry

(1) Objectives:

1. To acquaint and familiarize the students with the terminology in poetry criticism (i.e. the terms used in critical analysis and appreciation of poems)
2. To encourage students to make a detailed study of a few sample masterpieces of English poetry
3. To enhance students awareness in the aesthetics of poetry and to empower them to read, appreciate and critically evaluate the poetry independently

(2) Course Content:

A) Theory of Poetry

(a) What is poetry? Significant development in the art of poetry during major periods
(b) Elements of poetry: Rhythm, Metre, Sound structure, Stanza Forms,
(c) Figures of Speech, Symbols, Imagery, and other Poetic Devices like Repetition, Contrast.
(d) Types of poetry: Elegy, Sonnet, Dramatic Monologue, Lyric, Ode, Ballad

B) Prescribed Text: ***Auroral Musings: An Anthology of English Poetry***
Ed. Board of Editors, Orient Blackswan

Introduction

1. The Ballad of Sir Patrick Spens

2. ***Edmund Spenser***
Men Call You Fair

3. ***Sir Philip Sidney***
O Grammar Rules

4. ***William Shakespeare***
Sonnet 130

5. ***John Donne***
Broken Heart
Batter My Heart

6. ***Andrew Marvell***
The Coronet
The Definition of Love

7. *John Milton*

The Invocation' (an excerpt from *Paradise Lost*)

On His Blindness

8. *John Dryden*

Alexander's Feast: or the Power of Music; An Ode in Honor of St Cecilia's Day

9. *Alexander Pope*

Excerpt from Canto 1 of *Rape of the Lock*, 'Toilet Scene'

10. *Thomas Gray*

Ode on the Death of a Favourite Cat, Drowned in a Tub of Gold Fishes

11. *William Wordsworth*

Expostulation and Reply

The Tables Turned

A Slumber did my Spirit Seal

12. *Samuel Taylor Coleridge*

The Nightingale

Kubla Khan: A Vision in Fragments

13. *P. B. Shelley*

Ode to the West Wind

14. *John Keats*

La Belle Dame Sans Merci

Ode to Autumn

15. *Alfred, Lord Tennyson*

Ulysses

16. *Robert Browning*

My Last Duchess

17. *Matthew Arnold*

Dover Beach

18. *Dante Gabriel Rossetti*

The Blessed Damozel

19. *Thomas Hardy*

The Oxen

To an Unborn Pauper Child

20. G.M Hopkins

Pied Beauty

God's Grandeur

21. *W. B. Yeats*

Sailing to Byzantium

22. *Ralph Waldo Emerson*

Brahma

23. *Walt Whitman*

A Noiseless Patient Spider

24. ***Emily Dickinson***
Because I Could Not Stop for Death

Term-wise division of the syllabus:

Term-I

1. Theory of poetry
2. From- Auroral Musings: 01 to 10

Term-II

From- Auroral Musings: 11 to 24

Question Paper Pattern (Term-End Exam)

Textbook:- Auroral Musings

Time:- Two Hours **Total Marks:- 60**

Q 1- Questions on the theory of poetry (3 out of 5) [12]
Q 2- Practical questions on the application of theory to the poems prescribed (4 out of 6) [12]
Q 3-Theme-based questions on the poems prescribed (2 out of 3) [12]
Q 4- Theme-based questions on the poems prescribed (2 out of 3) [12]
Q 5- Reference to context (3 out of 5) [12]

Question Paper Pattern (Annual Exam)

Time:- Three Hours **Total Marks:- 80**

Q-1- Questions on the poems prescribed for the first term (3 out of 5) [16]
Q 2- Questions on the poems prescribed for the first term (3 out of 5) [16]
Q 3- Practical questions on the application of theory to the poems prescribed for the second term (2 out of 3) [16]
Q 4- Theme-based questions on the poems prescribed for the second term (2 out of 3)[16]
Q 5- Reference to context- poems prescribed for the second term (4 out of 6) [16]

पुणे विद्यापीठ

मराठी

द्वितीय वर्ष कला (S. Y.B.A.)

सन २०१४-१५ पासूनचा पुनर्रचित अभ्यासक्रम

S.Y.B.A.(G 2)

द्वितीय वर्ष कला (सामान्य स्तर २)

आधुनिक मराठी साहित्य आणि उपयोजित मराठी

उद्दिष्टे :

१ शुद्धलेखनाची ओळख करून देणे.

२ पारिभाषिक संज्ञांची ओळख करून देणे.

३ चरित्र-आत्मचरित्र या साहित्यप्रकारांच्या तात्त्विक घटकांचे ज्ञान करून देणे.

४ आधुनिक मराठी साहित्यातील निवडक चरित्र-आत्मचरित्रात्मक वेच्यांचे आकलन, आस्वाद आणि मूल्यमापन करण्याची क्षमता विद्यार्थ्यांमध्ये निर्माण करणे.

प्रथम सत्र

एकूण तास: ४८ **गुण: ६०**

१. उपयोजित मराठी

तास : १२ **गुण १५**

१ अर्जलेखन ५

२ अशुद्ध शब्द शुद्ध करून लिहिणे १०

२.'चरित्र' या साहित्यप्रकाराची तात्त्विक मीमांसा

तास : १२ **गुण १५**

१ चरित्र : संकल्पना

२ चरित्र : साहित्यप्रकाराचे स्वरूप

३ चरित्र : साहित्यप्रकाराची वाटचाल

३. पाठ्यपुस्तक

तास : २४ **गुण ३०**

जीवनवेध

संपादक : प्रा. डॉ.स्नेहल तावरे

प्रा. डॉ.शिरीष लांडगे

द्वितीय सत्र

एकूणतास: ४८ **गुण : ६०**

१) व्यावहारिक मराठी

तास : १२ **गुण १५**

१	सारांश लेखन	५
२	पारिभाषिक संज्ञा	१०

२) 'आत्मचरित्र' या साहित्यप्रकाराची तात्त्विक मीमांसा

तास : १२ **गुण १५**

१ आत्मचरित्र : संकल्पना

२ आत्मचरित्र व आत्मकथन : साम्य-भेद

३ आत्मचरित्र : साहित्यप्रकाराची वाटचाल

३) पाठ्यपुस्तक

तास : २४ **गुण ३०**

माझी जडणघडण

संपादक : प्रा.डॉ. स्नेहल तावरे

प्राचार्य डॉ. उज्ज्वला देवरे

संदर्भ ग्रंथ

१	चरित्र आत्मचरित्र (तंत्र आणि इतिहास)	प्रा. अ. म. जोशी
२	मराठी चरित्र मूलतत्त्वे व समीक्षा	ग.का.रावते
३	चरित्रचिंतन	द. न. गोखले
४	आत्मचरित्र मीमांसा	डॉ.आनंद यादव
५	चरित्र आणि आत्मचरित्र- (साहित्यरूप)	सदा कऱ्हाडे
६	मराठीतील आत्मचरित्रपर लेखन	उषा हस्तक
७	वाङ्.मयीन संज्ञाकोश	प्रभा गणोरकर व इतर (संपादक)
८	मराठी वाङ्.मयकोश खंड -४	विजया राजाध्यक्ष (संपादक)
९	चरित्रात्मक नाटक : संकल्पना आणि समीक्षा	डॉ. गीता मांजरेकर
१०	ललित, चरित्र/ आत्मचरित्रे विशेषांक - जून - जुलै २०१३	
११	स्वातंत्र्यपूर्व राजकीय नेत्यांच्या आत्माचरित्रांचा अभ्यास : एक चिकित्सा	डॉ.संजय घोडेकर
१२	स्वातंत्र्योत्तर राजकीय नेत्यांच्या आत्मचरित्रांचा अभ्यास : एक चिकित्सा	डॉ.संजय घोडेकर

प्रश्नपत्रिकेचे स्वरूप व गुण विभागणी आराखडा

प्रथम सत्र परीक्षा

वेळ : ३ तास **गुण ६०**

प्रश्न १ ला. खालील प्रश्नांची उत्तरे लिहा. **गुण १५**

१. दोनपैकी **एका** विषयावर अर्ज लेखन करणे. ०५

२. दिलेल्या परिच्छेदातील अशुद्ध शब्द शुद्ध करून पुन्हा परिच्छेद लिहिणे.
(किमान १०० शब्दांच्या परिच्छेदात फक्त **वीस** अशुद्ध शब्द देणे) १०

प्रश्न २रा. वीस शब्दांपर्यंत उत्तरे लिहा. **गुण २०**

१. चरित्राच्या तात्त्विक मीमांसेवरील सात प्रश्नांपैकी **पाच** प्रश्न सोडविणे.

२. 'जीवनवेध' या संपादित पाठ्यपुस्तकावरील सात प्रश्नांपैकी **पाच** प्रश्न सोडविणे.

प्रश्न ३रा. पन्नास शब्दांपर्यंत उत्तरे लिहा **गुण १०**

१. आत्मचरित्राच्या तात्त्विक मीमांसेवरील दोन प्रश्नांपैकी **एक** प्रश्न सोडविणे.

२. 'जीवनवेध' या संपादित पाठ्यपुस्तकावरील चार प्रश्नांपैकी **दोन** प्रश्न सोडविणे.

प्रश्न ४था. दीडशे शब्दांत उत्तरे लिहा. **गुण १५**

१ 'जीवनवेध' या संपादित पाठ्यपुस्तकावरील चार प्रश्नांपैकी **दोन** प्रश्न सोडविणे.

वार्षिक परीक्षा

वेळ : ३ तास **गुण ८०**

प्रश्न १ ला: खालील प्रश्नांची उत्तरे लिहा. **गुण१५**

१. वर्तमानपत्रासाठी जाहिरात लेखन (८)

२. पारिभाषिक संज्ञा (१४ इंग्लिश संज्ञांपैकी **७** सोडविणे.) (७)

प्रश्न २रा. वीस शब्दांपर्यंत उत्तरे लिहा. **गुण १०**

१. 'माझी जडणघडण'या पाठ्यपुस्तकावरील **सात** प्रश्नांपैकी **पाच** प्रश्न सोडविणे.

प्रश्न ३रा. पन्नास शब्दांपर्यंत उत्तरे लिहा. **गुण १५**

१ आत्मचरित्राच्या तात्त्विक मीमांसेवरील **पाच** प्रश्नांपैकी **तीन** प्रश्न सोडविणे.

प्रश्न ४था. दीडशे शब्दांपर्यंत उत्तरे लिहा **गुण १६**

१. 'जीवनवेध' या पाठ्यपुस्तकावर दोन प्रश्नांपैकी **एक** प्रश्न सोडविणे.

२. 'माझी जडणघडण' या पाठ्यपुस्तकावर दोन प्रश्नांपैकी **एक** प्रश्न सोडविणे.

प्रश्न ५वा. तीनशे शब्दांपर्यत उत्तरे लिहा. **गुण २४**

१ 'जीवनवेध' या पाठ्यपुस्तकावर दोन प्रश्नांपैकी **एक** प्रश्न सोडविणे.

२. 'माझी जडणघडण' या पाठ्यपुस्तकावर दोन प्रश्नांपैकी **एक** प्रश्न सोडविणे.

S. Y. B. A. (G 2)

द्वितीय वर्ष कला (सामान्य स्तर २)

पर्यायी अभ्यासक्रम

व्यावहारिक व उपयोजित मराठी

उद्दिष्टे :

१ संज्ञापनातील भाषेच्या भूमिकेचे, विविध आविष्कारांचे ज्ञान करून देणे.

२ भाषिक कौशल्यांचे विविध आविष्कार आणि प्रसारमाध्यमे यांच्या परस्परसंबंधाचे ज्ञान करून देणे.

३ भाषिक कौशल्ये व क्षमता विकसित करणे.

४ मराठीच्या कार्यालयीन व व्यावसायिक कामकाजात होणाऱ्या वापराची माहिती करून घेणे.

५ कार्यालयीन व व्यावसायिक भाषाव्यवहारासाठी आवश्यक लेखनकौशल्यांचे संपादन व उपयोजन करणे.

प्रथम सत्र

एकूण तास : ४८ **गुण : ६०**

१) कार्यालयीन मराठी भाषा

तास : १२ **गुण १५**

१ कार्यालयीन भाषाव्यवहाराचे स्वरूप

२ व्यवहारभाषा व कार्यालयीन भाषा : वेगळेपण.

२) पत्रव्यवहाराचे स्वरूप व वैशिष्ट्ये

तास : १२ **गुण १५**

१ पत्रलेखनाचे प्रयोजन

२ कार्यालयीन पत्रव्यवहार

३. अर्जलेखन- स्वरूप व वैशिष्ट्ये

तास : १२ **गुण १५**

१ अर्जलेखनाचे प्रयोजन

२ अर्जलेखनाचे प्रकार

३ अर्जलेखनाचा मसुदा (Format): प्रयोजन व स्वरूप

४ अर्जलेखन : प्रात्यक्षिक (कार्यालयीन अर्जांचे विविध नमुने गोळा करणे,मसुदा तयार करणे)

४) इतिवृत्त- संकल्पना व स्वरूप

तास : १२ **गुण १५**

१ इतिवृत्तलेखनाचे स्वरूप

२ इतिवृत्तलेखनाचे प्रयोजन

३ इतिवृत्तलेखनाची पद्धती

४ इतिवृत्त लेखन : प्रात्यक्षिक (शासकीय व इतर कार्यालयांत वेगवेगळ्या कारणांनी व वेगवेगळ्या स्तरांवर लिहिली गेलेली इतिवृत्ते मिळवश्न अभ्यासणे. प्रत्यक्ष कार्यक्रमाचे इतिवृत्त लेखन)

द्वितीय सत्र

एकूण तास : ४८ **गुण : ६०**

१) कार्यालयीन टिप्पणी लेखन

तास : १२ **गुण १५**

१ कार्यालयीन टिप्पणी लेखनाचे स्वरूप

२ कार्यालयीन टिप्पणी लेखनाचे प्रयोजन

३ कार्यालयीन टिप्पणी लेखनाची पद्धती,

४ कार्यालयीन टिप्पणी : प्रात्यक्षिक (शासकीय व इतर कार्यालयांत वेगवेगळ्या कारणांनी व वेगवेगळ्या स्तरांवर लिहिल्या गेलेल्या टिप्पण्या मिळवून अभ्यासणे. प्रत्यक्ष कार्यालयीन टिप्पणी लेखन करणे.)

२) पत्रकलेखन

तास : १२ **गुण १५**

१ पत्रकलेखनाचे स्वरूप

२ पत्रकलेखनाचे प्रयोजन

३ पत्रकलेखन : प्रकार (निवेदनपत्रक, निविदा, सूचनापत्रक, माहितीपत्रक, घोषणापत्रक, प्रसिद्धीपत्रक, परिपत्रक.)

४ पत्रकलेखन : प्रकार व प्रात्यक्षिक (विविध कार्यालयीन पत्रक व्यवहारांचे नमुने गोळा करणे.)

३) संपादन : संकल्पना व स्वरूप

तास : १२ **गुण १५**

१ संपादनाचे प्रयोजन व भूमिका

२ संपादनाचे नियोजन व पूर्वतयारी

३ संपादन - स्मरणिका, गौरविका, संस्थापत्रिका, वार्षिक अहवाल, समीक्षाग्रंथ इ.

४ संपादन : प्रात्यक्षिक (विविध संपादनांचा संग्रह करून संपादकीय कौशल्याचे निरीक्षण करणे)

४) कार्यालयीन दफ्तर व्यवस्थापन : संकल्पना व स्वरूप

तास : १२ **गुण १५**

१ कार्यालयीन कागदपत्रांचे स्वरूप

२ कार्यालयीन कागदपत्रांचे वर्गीकरण

३ कार्यालयीन कागदपत्रे : धारिका (फाईल) व्यवस्थापन (अनुक्रमणिका, विभागीय रचना, टॅग इ.)

४ धारिकांचे प्रकार व कागदपत्रांचे व्यवस्थापन.

संदर्भ पुस्तके

१. व्यावहारिक मराठी पाठ्यपुस्तक -द्वितीय वर्ष वाणिज्य व द्वितीय वर्ष विज्ञान-पुणे विद्यापीठ प्रकाशन,पुणे.

२. व्यावहारिक मराठी- कल्याण काळे व द.दि.पुंडे, निराली प्रकाशन,पुणे.

३. व्यावहारिक मराठी- ल.रा.नसिराबादकर, फडके प्रकाशन, कोल्हापूर.

४. नवभारत- व्यावहारिक मराठी विशेषांक, ऑगस्ट-सप्टें, १९८२, प्राज्ञ पाठशाला, वाई.

५. उपयोजित अभ्यासक्रम, मराठी भाषेची संवादकौशल्ये-प्रकाशक: यशवंतराव महाराष्ट्र मुक्त विद्यापीठ, नाशिक.

६. शासनव्यवहारात मराठी (समस्या :स्वरूप: प्रक्रिया)- भाषा संचालनालय,महाराष्ट्र शासन, शासकीय फोटो झिंको मुद्रणालय, पुणे-१९९७

७. 'अभिलेख' व्यवस्थापनाची मार्गदर्शिका - संकलक व लेखक : डॉ.संजीव प.देसाई,संपा.भास्कर धाटावकर, पुराभिलेख विभाग, महाराष्ट्र शासन, शासकीय मुद्रणालय, मुंबई.

८. व्यावहारिक मराठी- प्रकाश परब, मिथुन प्रकाशन, प्रथमावृत्ती : जश्न १९८९,डोंबिवली (पूर्व).

९. व्यावहारिक मराठी - डॉ. स्नेहल तावरे

१०. व्यावहारिक मराठी - डॉ. गोविलकर , डॉ. पाटणकर

११. भाषिक सर्जन आणि उपयोजन - राजन गवस, अरुण शिंदे, गोमटेश्वर पाटील

११. व्यावहारिक मराठी - डॉ. मोकाशी, डॉ. नेमाडे

१२. व्यावहारिक आणि उपयोजित मराठी - डॉ. मनोहर रोकडे

१३. मराठी साहित्य : काही लेखनबंध - डॉ.सुधाकर शेलार

प्रश्नपत्रिकेचे स्वरूप व गुण विभागणी आराखडा

प्रथम सत्र परीक्षा

वेळ : ३ तास **गुण ६०**

प्रश्न १ ला: वीस शब्दांपर्यंत उत्तरे लिहा. **२०**

चौदा प्रश्नांपैकी **दहा** प्रश्न सोडविणे.

प्रश्न २ रा: पन्नास शब्दांपर्यंत उत्तरे लिहा. **१०**

१. प्रकरण १ व प्रकरण २ वरील **दोन** पैकी **एका** प्रश्नाचे उत्तर सोडविणे.

२. प्रकरण ३ व प्रकरण ४ वरील **दोन** पैकी **एका** प्रश्नाचे उत्तर सोडविणे.

प्रश्न ३ रा: दीडशे शब्दांपर्यंत उत्तरे लिहा. **३०**

१. प्रकरण १ व प्रकरण २ वरील **चार** पैकी **दोन** प्रश्नाचे उत्तर सोडविणे.

२. प्रकरण ३ व प्रकरण ४ वरील **चार** पैकी **दोन** प्रश्नाचे उत्तर सोडविणे.

वार्षिक परीक्षा

वेळ : ३ तास **गुण ८०**

प्रश्न १ ला: वीस शब्दांपर्यंत उत्तरे लिहा. **२०**

द्वितीय सत्रातील प्रकरणांवर चौदा प्रश्नांपैकी **दहा** प्रश्न सोडविणे.

प्रश्न २ रा: पन्नास शब्दांपर्यंत उत्तरे लिहा. **१०**

१ प्रथम सत्रातील दोन पैकी **एका** प्रश्नाचे उत्तरे सोडविणे.

२ द्वितीय सत्रातील दोन पैकी **एका** प्रश्नाचे उत्तरे सोडविणे.

प्रश्न ३ रा: दीडशे शब्दांपर्यंत उत्तरे लिहा. **२०**

१. द्वितीय सत्रातील प्रकरण १ व प्रकरण २ वरील **दोन** पैकी **एका** प्रश्नाचे उत्तर सोडविणे.

२. द्वितीय सत्रातील प्रकरण १ व प्रकरण २ वरील **दोन** पैकी **एका** प्रश्नाचे उत्तर सोडविणे.

प्रश्न ४ था: तीनशे शब्दांपर्यंत उत्तरे लिहा. **३०**

१ प्रथम सत्रातील दोन पैकी **एका** प्रश्नाचे उत्तरे सोडविणे.

२ द्वितीय सत्रातील दोन पैकी **एका** प्रश्नाचे उत्तरे सोडविणे.

S. Y. B. A. (S 1)

द्वितीय वर्ष कला (विशेषस्तर १)

मराठी साहित्यातील विविध साहित्यप्रकार

उद्दिष्टे :

१ मराठी साहित्यप्रकारांच्या तात्त्विक घटकांचे ज्ञान देणे.

२ वेगवेगळ्या कालखंडातील मराठीतील अभिजात साहित्यकृतींचा संस्कार घडविणे. साहित्याविषयीची अभिरुची निर्माण करणे.

३ साहित्यकृतीला मुक्त प्रतिसाद देण्याची क्षमता विकसित करणे.

४ साहित्यकृतीचे आकलन, आस्वाद आणि मूल्यमापन करण्याची दृष्टी निर्माण करणे.

५ साहित्याचा सूक्ष्म पातळीवर अभ्यास करण्याची क्षमता विकसित करणे.

६ पदव्युत्तर अभ्यास करण्याची पूर्वतयारी करणे.

सत्र पहिले

नाटक

एकूण तास: ४८ **सत्रांत परीक्षा गुण: ६०**

१) तात्त्विक मीमांसा

तास : १२ **गुण १५**

१ : **नाटक या साहित्यप्रकाराची तात्त्विक मीमांसा**

१ नाटक साहित्यप्रकाराची संकल्पना

२ नाटकाचे घटक

३ नाटकाचे प्रकार

४ नाटक या साहित्यप्रकाराची वाटचाल

२) नाटक संहिता

तास : ३६ **गुण ४५**

नटसम्राट- वि.वा.शिरवाडकर

संदर्भ ग्रंथ

१ शोकनाट्याचे साहित्यरूप - डॉ. सदा कऱ्हाडे

२ ॲरिस्टाटलाचे काव्यशास्त्र - गो.वि. करंदीकर

३ मराठी रंगभूमी : घटना आणि परंपरा - डॉ. भालेराव स्मृतिग्रंथ

४ मराठी नाट्यतंत्र (संपा.) मो.द. ब्रह्मे

५ आजचे नाटककार (सं.)डॉ. द. दि.पुंडे/ डॉ. स्नेहल तावरे

६ नट नाटक व नाटककार - व.शां. देसाई

७ कुसुमाग्रज - शिरवाडकर एक शोध - डॉ. द. दि. पुंडे

८ मराठी शोकात्म नाटके - डॉ. उज्ज्वला जाधव

९ भारतीय रंगभूमीची परंपरा - डॉ. माया सरदेसाई

१० मराठी शोकांतिका : नवविचार - डॉ. पुष्पलता राजापुरे - तापस

११ स्वातंत्र्योत्तर सामाजिक नाट्यसृष्टी - डॉ. श्रीकांत पाटील

१२ भारतीय नाट्यप्रयोगविज्ञान - प्रा.अ. म. जोशी

१३ Shakespearean Tragedy - A. C. Brally

१४ Modern Tragedy - Raymond Williams

१५ नटसम्राट :एक अभ्यास - प्रा.मो.द. ब्रह्मे

१६ नटसम्राट : एक समीक्षा (संपा.) - गो. तु. पाटील

१७ शिरवाडकरांची नाटके - डॉ. शोभा देशमुख

१८ कुसुमाग्रज साहित्यदर्शन - डॉ. उषा देशमुख

१९ स्वातंत्र्योत्तर सामाजिक नाट्यसृष्टी - डॉ. श्रीकांत पाटील

२० मराठी नाटक : नव्या दिशा नवी वळणे - डॉ. तारा भवाळकर

२१ भरतमुनींचे नाट्यशास्त्र - डॉ. सरोज देशपांडे

द्वितीय सत्र

कादंबरी

एकूण तासः ४८ **सत्रांत परीक्षा गुणः ६०**

१) तात्त्विक मीमांसा

तास : १२ **गुण १५**

१ : कादंबरी या साहित्यप्रकाराची तात्त्विक मीमांसा

१ कादंबरी या साहित्यप्रकाराची संकल्पना

२ कादंबरीचे घटक

३ कादंबरीचे प्रकार

४ कादंबरी या साहित्यप्रकाराची वाटचाल

२) कादंबरी संहिता

तास : ३६ **गुण ४५**

फकिरा -अण्णा भाऊ साठे

संदर्भ ग्रंथ

१ अण्णा भाऊ साठे साहित्य समीक्षा - (संपा.) प्रा. रणधीर शिंदे

२ अण्णा भाऊ साठे - बजरंग कोरडे

३ अण्णा भाऊ साठे समाजविचार आणि साहित्य विवेचन - डॉ. बाबुराव गुरव

४ लोकशाहीर अण्णा भाऊ साठे निवडक वाङ्मय - (संपा.) अर्जुन डांगळे

५ ग्रामीण दलित कादंबरी : तुलना (संपा.) डॉ. भास्कर शेळके

६ ग्रामीण दलित साहित्य : डॉ. मधुकर मोकाशी

७ दलित साहित्य : डॉ. नीला पांढरे

८ चरित्र आणि आत्मचरित्र वाङ्मयप्रकारांचे विवेचन - सदा कऱ्हाडे

९ युगांतर - दिवाळी अंक १९६९ अण्णाभाऊ साठे विशेषांक (संपा - श्रीकृष्ण पोवळे)

१० समाज सुधारक लोकशाहीर अण्णाभाऊ साठे (संपा.) ॲड. महेंद्र शिंदे

११ फकिरा: एक आकलन - डॉ. वैशाली भालसिंग

१२ मराठी प्रादेशिक कादंबरी - स्वरूप आणि विश्लेषण - डॉ. भास्कर शेळके

१३ अण्णा भाऊ साठे समग्र वाड्मय - आसाराम गायकवाड

१४ परिवर्तनाचा जागर - डॉ.गिरीष मोरे

१५ जननायक अण्णा भाऊ साठे- डॉ.शिवाजी जवळगेकर

१६ दलित व दलितेतरांची कथा : एक अभ्यास - डॉ.श्रीराम गडकर

प्रश्नपत्रिकेचे स्वरूप व गुण विभागणी आराखडा

प्रथम सत्र परीक्षा

वेळ : ३ तास **गुण ६०**

प्रश्न १ ला: पन्नास शब्दांपर्यंत उत्तरे लिहा. **१५**

नाटक या साहित्यप्रकाराच्या तात्त्विक मीमांसेवर पाच प्रश्नांपैकी **तीन** प्रश्न सोडविणे.

प्रश्न २ रा : वीस शब्दांपर्यंत उत्तरे लिहा. **१०**

'नटसम्राट' या नाटकावर दहा प्रश्न विचारणे **पाच** सोडविणे.

प्रश्न ३रा. पन्नास शब्दांपर्यंत उत्तरे लिहा. **१५**

'नटसम्राट' या नाटकावर सहा प्रश्न विचारणे **तीन** सोडविणे.

प्रश्न ४था. दीडशे शब्दांपर्यंत उत्तरे लिहा. **२०**

'नटसम्राट' या नाटकावर चार प्रश्न विचारणे **दोन** सोडविणे.

वार्षिक परीक्षा

वेळ : ३ तास **गुण ८०**

प्रश्न १ ला: खालील प्रश्नांची उत्तरे लिहा. **१५**

कादंबरी या साहित्यप्रकाराच्या तात्त्विक मीमांसेवर पाच प्रश्नांपैकी **तीन** प्रश्न सोडविणे.

प्रश्न २ रा. वीस शब्दांपर्यंत उत्तरे लिहा. **१०**

'फकिरा' या कादंबरीवर सात प्रश्नांपैकी **पाच** प्रश्न सोडविणे.

प्रश्न ३रा. पन्नास शब्दांपर्यंत उत्तरे लिहा. **०५**

'फकिरा' या कादंबरीवर दोन प्रश्नांपैकी **एक** प्रश्न सोडविणे.

प्रश्न ४था. दीडशे शब्दांपर्यंत उत्तरे लिहा. **२०**

१. 'नटसम्राट' या नाटकावर दोन प्रश्नांपैकी **एक** प्रश्न सोडविणे.

२. 'फकिरा'वर कादंबरीवर दोन प्रश्नांपैकी **एक** प्रश्न सोडविणे.

प्रश्न ५वा. तीनशे शब्दांपर्यंत उत्तरे लिहा. **३०**

१. 'नटसम्राट' या नाटकावर दोन प्रश्नांपैकी **एक** प्रश्न सोडविणे.

२. 'फकिरा'वर कादंबरीवर दोन प्रश्नांपैकी **एक** प्रश्न सोडविणे.

S. Y. B. A. (S 2)

द्वितीय वर्ष कला (विशेषस्तर २)

अर्वाचीन मराठी वाङ्मयाचा इतिहास (इ. स. १८१८ ते १९६०)

उद्दिष्टे :

१ विशेषस्तरावर अभ्यासाचा प्रारंभ होत असताना, मराठी साहित्याच्या ऐतिहासिक परंपरेचे स्थूल ज्ञान करून देणे.

२ विशिष्ट कालखंडाच्या पार्श्वभूमीवर साहित्यामागील प्रेरणा, प्रवृत्तींचे ज्ञान करून देणे.

३ साहित्यप्रकारांच्या विकसनशील परंपरेचे स्थूल ज्ञान करून देणे.

४ पदव्युत्तर अभ्यास करण्याची पूर्वतयारी करणे.

सत्र पहिले

अर्वाचीन मराठी वाङ्मयाचा इतिहास (इ. स. १८१८ ते १९२०)

एकूणतास: ४८ **सत्रांत परीक्षा गुण: ६०**

१) कालखंड : इ.स. १८१८ ते १८७४

तास : १२ **गुण ३०**

१ या कालखंडातील सामाजिक, धार्मिक, राजकीय, सांस्कृतिक आणि वाङ्मयीन पार्श्वभूमी.

२ या कालखंडातील साहित्य निर्मिती मागील प्रेरणा आणि प्रवृत्ती.

३ या कालखंडातील निबंध, कविता, कथा, कादंबरी, नाटक, चरित्र, आत्मचरित्र या निवडक वाङ्मयप्रकारांचा स्थूल आढावा.

२) कालखंड : इ.स. १८७५ ते १९२०

तास : १२ **गुण ३०**

१ या कालखंडातील सामाजिक, धार्मिक, राजकीय, सांस्कृतिक आणि वाङ्मयीन पार्श्वभूमी.

२ या कालखंडातील साहित्य निर्मिती मागील प्रेरणा आणि प्रवृत्ती.

३ या कालखंडातील निबंध, कविता, कथा, कादंबरी, नाटक, चरित्र, आत्मचरित्र या निवडक वाङ्मयप्रकारांचा स्थूल आढावा.

द्वितीय सत्र

अर्वाचीन मराठी वाङ्मयाचा इतिहास (इ. स. १९२१ ते १९६०)

एकूणतासः ४८ **सत्रांत परीक्षा गुणः ६०**

१) कालखंड : इ.स. १९२१ ते १९४५

तास : १२ **गुण ३०**

१ या कालखंडातील सामाजिक, धार्मिक, राजकीय, सांस्कृतिक आणि वाङ्मयीन पार्श्वभूमी.

२ या कालखंडातील साहित्यनिर्मिती मागील प्रेरणा आणि प्रवृत्ती.

३ या कालखंडातील निबंध, कविता, कथा, कादंबरी, नाटक, चरित्र, आत्मचरित्र, ललितगद्य इ. या निवडक वाङ्मयप्रकारांचा स्थूल आढावा.

२) कालखंड : इ.स. १९४६ ते १९६०

तास : १२ **गुण ३०**

१ या कालखंडातील सामाजिक, धार्मिक, राजकीय, सांस्कृतिक आणि वाङ्मयीन पार्श्वभूमी.

२ या कालखंडातील साहित्य निर्मिती मागील प्रेरणा आणि प्रवृत्ती.

३ या कालखंडातील निबंध, कविता, कथा, कादंबरी, नाटक, चरित्र, आत्मचरित्र, ललितगद्य इ. या निवडक वाङ्मयप्रकारांचा स्थूल आढावा.

संदर्भ ग्रंथ

१ मराठी वाङ्मयाचा इतिहास खंड ४,५,६, म.सा.प. पुणे.

२ अर्वाचीन मराठी गद्याची पूर्वपीठिका- गं.बा. सरदार

३ महाराष्ट्र जीवन खंड १ व खंड २ गं. बा. सरदार

४ साहित्य समाज आणि संस्कृती- दिंगबर पाध्ये

५ मराठी वाङ्मयाचा विवेचक इतिहास - प्र. न. जोशी

७ महाराष्ट्राचा सांस्कृतिक इतिहास - शं. दा. पेंडसे

८ मराठी गद्याचा इंग्रजी अवतार - द.वा. पोतदार

९ मराठी वाङ्मयाची सांस्कृतिक पार्श्वभूमी- गो. म. कुलकर्णी

१० मराठी कादंबरी पहिले शतक - कुसुमावती देशपांडे

११ मराठी कथा उद्गम आणि विकास - इंदुमती शेवडे

१२ धार आणि काठ - नरहर कुरूंदकर

१३ मराठी साहित्य प्रेरणा व स्वरूप - गो. मा. पवार

१४ मराठी कविता: १९४५ ते १९६० - रा. श्री. जोग

१५ मराठी कादंबरीचा इतिहास - चंद्रकांत बांदिवडेकर

१६ अर्वाचीन मराठी साहित्याची सांस्कृतिक पार्श्वभूमी - सदा कऱ्हाडे

१७ आधुनिक मराठी वाङ्मयाचा इतिहास खंड १,२ डॉ.अ.ना.देशपांडे

१८ प्रदक्षिणा खंड १,२ कॉन्टिनेन्टल , पुणे

१९ मराठी कादंबरी- प्रेरणा व स्वरूप - कुसुमावती दशेपांडे

२० कादंबरी आणि मराठी कादंबरी- उषा हस्तक

२१ मराठी प्रादेशिक कादंबरी - डॉ.मदन कुलकर्णी

२२ कादंबरी - ल.ग.जोग

२३ एकोणिसावे शतक : सुधारणावाद व मराठी साहित्य - डॉ.सुधाकर शेलार

२४ मराठी कादंबरी - चंद्रकांत बांदिवडकेर

२५ खडक आणि पाणी - गंगाधर गाडगीळ

२६ स्त्री व्यक्तिरेखा : गोनीदांच्या - डॉ. उज्ज्वला देवरे

२७ मराठी कवितेतील स्त्री चित्रण - डॉ. वेदश्री थिगळे

२८ महनगरीय कादंबरी : अंशदर्शन - डॉ.आनंदा गांगुर्डे

प्रश्नपत्रिकेचे स्वरूप व गुण विभागणी आराखडा

प्रथम सत्र परीक्षा

वेळ : ३ तास **गुण ६०**

प्रश्न १ ला: वीस शब्दांपर्यंत उत्तरे लिहा. **२०**

प्रथम सत्रातील साहित्यप्रकाराच्या वाटचालीवर चौदा प्रश्नांपैकी **दहा** प्रश्न सोडविणे.

प्रश्न २ रा : पन्नास शब्दांपर्यंत उत्तरे लिहा. **१५**

प्रथम सत्रातील साहित्यप्रकारांच्या विशिष्ट कालखंडातील प्रेरणा आणि प्रवृत्तींवर पाच प्रश्नांपैकी **तीन** प्रश्न सोडविणे.

प्रश्न ३रा. पन्नास शब्दांपर्यंत उत्तरे लिहा. **१०**

प्रथम सत्रातील साहित्यप्रकारांच्या विशिष्ट कालखंडातील वैशिष्ट्यांवर पाच प्रश्नांपैकी **दोन** प्रश्न सोडविणे.

प्रश्न ४था. दीडशे शब्दांपर्यंत उत्तरे लिहा. (वाटचालीवर) **१५**

प्रथम सत्रातील साहित्यप्रकाराच्या वाटचालीवर दोन प्रश्नांपैकी **एक** प्रश्न सोडविणे.

वार्षिक परीक्षा

वेळ : ३ तास **गुण ८०**

प्रश्न १ ला: वीस शब्दांपर्यंत उत्तरे लिहा. **१०**

दुसऱ्या सत्रातील साहित्यप्रकाराच्या वाटचालीवर सातप्रश्नांपैकी **पाच** प्रश्न सोडविणे.

प्रश्न२ रा. पन्नास शब्दांपर्यंत उत्तरे लिहा. **१५**

दुसऱ्या सत्रातील साहित्यप्रकारांच्या विशिष्ट कालखंडातील प्रेरणा आणि प्रवृत्तींवर पाच प्रश्नांपैकी **तीन** प्रश्न सोडविणे.

प्रश्न ३रा. पन्नास शब्दांपर्यंत उत्तरे लिहा. **०५**

दुसऱ्या सत्रातील साहित्यप्रकारांच्या विशिष्ट कालखंडातील वैशिष्ट्यांवर पाच प्रश्नांपैकी **दोन** प्रश्न सोडविणे.

प्रश्न ४था. दीडशे शब्दांपर्यंत उत्तरे लिहा **२०**

१ प्रथम सत्राच्या साहित्याच्या वाटचालीवर दोन प्रश्नांपैकी **एक** प्रश्न सोडविणे.

२ द्वितीय सत्राच्या साहित्याच्या वाटचालीवर दोन प्रश्नांपैकी **एक** प्रश्न सोडविणे.

प्रश्न ५वा. तीनशे शब्दांपर्यंत उत्तरे लिहा. **३०**

१ प्रथम सत्राच्या साहित्याच्या वाटचालीवर दोन प्रश्नांपैकी **एक** प्रश्न सोडविणे.

२ द्वितीय सत्राच्या साहित्याच्या वाटचालीवर दोन प्रश्नांपैकी **एक** प्रश्न सोडविणे.

University of Pune

F. Y. B. A. Political Science

G-1 General Paper

INDIAN GOVERNMENT AND POLITICS

OR

MODERN INDIAN POLITICAL THOUGHT

(80. 20 pattern to be Implemented from 2013-2014)

University of Pune
F. Y. B. A. Political Science
G-1 General Paper

INDIAN GOVERNMENT AND POLITICS

(80. 20 pattern to be implemented from 2013-2014)

COURSE RATIONALE

This paper focuses in detail on the political processes and the actual functioning of the political system .It simultaneously studies in detail the political structure both Constitutional and Administrative. It emphasizes on local influences that derive from social stratification of castes and jatis, from language, religion, ethic and economic determinants and critically assesses its impact on the political processes. the major contradictions of the Indian Political Process are to be critically analyzed along with an assessment of its relative success and failure in a comparative perspective with other developing countries and in particular those belonging to the South Asian region.

Term I **Period**

Topic 1: Background and the Salient Features of Indian Constitution

a) Formation of Constituent Assembly
b) Philosophy of the Preamble for Indian Constitution 12
c) Major Features: Parliamentary Democracy, Federalism, Independent Judiciary –Social Justice and Social Transformation

Topic 2: Fundamental Rights, Duties and the Directive Principles of State Policy

a) Nature of Fundamental Rights –Major Fundamental Rights-Right to Equality, Right to Liberty, Right to Freedom of Religion, Cultural and Educational Rights 12
b) Importance of Fundamental Duties
c) Nature and Significance of Directive Principles of State Policy

Topic 3: Federalism

a) Salient Features of Indian Federalism
b) Centre –State Relations 12
c) Issues of Conflict-Water Issue, Border Issue and Sharing of Resources

Topic 4: Structure of Union Government -Legislature-Executive –Judiciary

a) Union Legislature - Structure-Powers and Role
b) Union Executive-President, Prime Minister and his Cabinet- Role and Functions 12
c) Judiciary- Nature of Judiciary, Supreme Court-Powers and Functions

Term II

Topic 5: Structure of State Government -Legislature-Executive –Judiciary

a) State Legislature - Structure-Powers and Role 12
b) State Executive-Governor , Chief Minister and his Cabinet- Role and Functions
c) Judiciary- Nature of Judiciary, High Court-Powers and Functions

Topic 6: Party System and Elections

a) Nature and Changing Pattern of Party System
b) Elections- Election Commission :-Major Features of Electoral System and Patterns Of Voting Behavior 12
c) Rise and Role of Regional Parties

Topic 7: Role of Caste and Religion in Indian Politics

a) Caste and Politics of Identity
b) Rise of OBCs 12
c) Religion and Politics of Communalism

Topic 8: Issues of Regionalism and Development

a) Causes and Patterns of Regionalism
b) Issues of Development-Uneven Development-Leading to Regional Imbalance-Poverty Eradication, Health and Education 12

Readings:

Chavan Shankar,Bhartiya Shashan ani Rajkaran,Pratima Prakashan,Pune

Jagatap Bhanudas,P.Bhartiya Shashan ani Rajkaran.

Lodhi Kaniz Fatema Niyaz Ahmed and Prof.Salma A.S, :Government and Politics of india ,Prashnt Publication,Jalgaon.

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T.V. Sathyamurthy, Social Change and Political Discourse in India: Structures of Power,Movements of Rersistance,Vol.4.,Oxford University Press,1996.

Rajendra Vora and Suhas Pulshikar,Indian Democracy:Meaning and Practice ,Sage Publication-New Delhi,2004.

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Singh Mahendra Prasad and Raj Subhendu Ranjan,The Indian Political System (edt) Dorling Kindersley (India) Pvt Ltd,Pearson Education Society Delhi 2012.

कारेकर मंजिरी आणि सुवर्णा बेनके, 'भारताचे शासन आणि राजकारण', पीअर्सन एज्युकेशन, दिल्ली २०१४

जाधव तुकाराम आणि महेश शिरपुरकर 'भारतीय राज्यघटना व घटनात्मक प्रक्रिया', द युनिक ॲकॅडमी, प्रथम आवृत्ती जाने.२०११

भोळे भा. ल.— 'भारतीय गणराज्याचे शासन आणि राजकारण' पिंपळापुरे ॲण्ड कंपनी पब्लिशर्स नागपूर, जून २००३

प्रा. बी. बी. पाटील, प्रा. सौ. उर्मिला चव्हाण, 'भारतीय शासन आणि राजकारण' फडके प्रकाशन, कोल्हापूर.

वाईकर अनंत— 'भारतीय शासन आणि राजकारण' निराली प्रकाशन, पुणे

बाचल वि. मा., स. मा. गोळवलकर—भारतीय गणराज्य (शासन आणि राजकारण), सुविचार प्रकाशन मंडळ, पुणे—४११०३०

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खांदवे एकनाथ — महाराष्ट्राचे शासन व राजकारण, आरती प्रकाशन, कर्जत

University of Pune
F. Y. B. A. Political Science
G-1 General Paper

FYBA Optional Paper

MODERN INDIAN POLITICAL THOUGHT

COURSE RATIONALE

This is an introductory paper to the concepts, ideas and theories that developed in India. It highlights the main sources of the political traditions in ancient India and its development in modern times. It focuses on key thinkers from ancient to modern times to understand their seminal contribution to the evolution of Political theorizing in India. It critically assesses their contribution and explains thinkers to political theorizing and the relative autonomy of Indian political thought. It also situates Indian political thought vis-à-vis other traditions.

Term I	**Period**

Topic 1: Jyotiba Phule (1827-1890)

a) Radical liberalism
b) Critique of Brahmanism and money lenders — 12
c) Views on emancipation of Shudra-Atishudra and Women
d) Doctrine of Sarvajnik Satyadharma

Topic 2: M.G.Ranade (1842-1901)

a) Liberalism
b) Understanding of British Rule in India — 12
c) Views on State and Economy
d) Views on Social Reforms

Topic 3: B.G.Tilak (1856-1920)

a) Tilak's theory of Nationalism
b) Views on 'Swarajya' 12
c) Critique of Social Reformism
d) Doctrine of 'Loksangraha'

Topic 4: M.K.Gandhi (1869-1948)

a) Theory of Satyagraha-meaning of Non Violence-Ends and Means Debate,Forms of Satyagraha
b) Critique of Western Civilization 12
c) Views on Sarvodya
d) Views on Communal Harmony

Term II

Topic 5: B.R. Ambedkar (1891-1956)

a) Critique of Caste System and Ways to Annihilate the Caste System
b) Theory of Social Democracy 12
c) Views on State Socialism
d) Doctrine of Dhamma

Topic 6: M.N.Roy (1887-1954)

a) Understanding of Marxism
b) Understanding and Critique of Indian National Movement 12
c) Radical Humanism

Topic 7: V.D.Savarkar (1883-1966)

a) Theory of Hindutva
b) Understanding and Critique of British Rule in India 12
c) Views on Eradication of Caste Discrimination
d) Savarkar's views on Religion and Science

Topic 8: Abul Kalam Azad (1888-1958)

a) Theory of Nationalism
b) Interpretation of Islam 12
c) Views on Communal Harmony
d) Pan -Islamism

Readings:

Thomas Pantham and Kennein L.Deutsch, Political Thought in Modern India ,New Delhi,Sage Publication

____Modern Indian Political Thought,Delhi,Alied 1984.

K.S.Padhy Indian Political Thought, Eastern Publication –PHI Learning Private Limited New Delhi.2011.

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M.P.Singh and Himanshu Roy Indian Political Thought Themes and Thinkers(edt), Dorling Kindersley (India) Pvt Ltd,Pearson Education Society Delhi 2011

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Bhole B.L- Adhunik Bhartiya Rajakiya Vicharvant, Pimpalapure Prakashan Nagapur.

पाटील वा. भा. 'आधुनिक राजकीय विचारवंत', प्रशांत पब्लिकेशन, जळगांव

कुलकर्णी व्ही. जी., कांत सोमवंशी—'भारतीय विचारवंत', कैलास पब्लिकेशन, औरंगाबाद.

भोळे भा. ल. 'भारतीय राजकीय विचारवंत' तिरूपती प्रकाशन, नारळीबाग, औरंगाबाद.

शिंदे ज. रा., परळीकर रेखा, 'भारतीय राजकीय विचारवंत', तिरूपती प्रकाशन, नारळीबाग, औरंगाबाद

महात्मा फुले समग्र वाड:मय, महाराष्ट्र शासन प्रकाशन

University of Pune

S.Y.B.A Political Science

G-2 General Paper

POLITICAL THEORY& CONCEPTS

(80-20 Pattern to be implemented from 2014-2015)

Course Objectives:

This is an introductory paper to the concepts, ideas and theories in political theory. It seeks to explain the evolution and usage of these concepts, ideas and theories with reference to individual thinkers both historically and analytically. The different ideological standpoints with regard to various concepts and theories are to be critically explained with the purpose of highlighting the differences in their perspectives and in order to understand their continuity and change. Furthermore there is a need to emphasize the continuing relevance of these concepts today and explain how an idea and theory of yesteryears gains prominence in contemporary political theory.

Term-I

Unit: 1 - Introducing Political Theory

a) **Definitions, Nature &Scope**
b) **Traditions of Political Theory: Liberal & Conservative**

Unit: 2 - State

a) **Definitions Meaning and Elements**
b) **Perspectives on State (Liberal, Marxist)**

Unit: 3 - Power & Authority

a) **Conceptions of Power, Power as Exploitation, Authority, Hegemony, Foucault on Power**
b) **Authority: Meaning, Nature & its forms**

Unit-4 - Right and Justice

a) **Meaning, Nature &Kinds of Rights**
b) **Dimensions of Justice (Social, Economic Political)**

Term-II

Unit: 5 – Liberty and Equality

a) **Liberty: Meaning, Nature, Classification: Negative & Positive Liberty**
b) **Equality: Meaning, Nature, Types of Equality: Equality OF Opportunity; political Equality, Affirmative Action**

Unit: 6 – Democracy

a) **The Concept of Democracy, Direct Participatory & Liberal Democracy**
b) **Perspectives on Democracy, Merits and demerits**

Unit: 7 – Sovereignty

a)Meaning & Characteristics of sovereignty
b)Theory of Popular Sovereignty

Unit 8: Globalisation

a) Definition, Meaning
b) Impact of Globalisation

Readings:

Lodhi Kaniz Fatema, Political Theory

Chavan Shankar Political Theory , Pratima Prakshan ,Pune.

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Bhargava Rajeev & Ashok Acharya (eds), Political Theory: An Introduction. Pearson Longman, 2008. (English Medium)
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R. Miliband, Marxism and Politics, Oxford, Oxford University Press, 1977.
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S. M. Okin, Justice, Gender and the Family, New York, Basic Books, 1989.

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C. Tilly, The Formation of National States in Western Europe, Princeton NJ, Princeton University Press, 1975.

R. M. Titmuss, Essays on the Welfare State, London, George Allen and Unwin, 1956.

F. Thakurdas, Essays on Political Theory, New Delhi, Gitanjali, 1982.

S. P. Varma, Modern Political Theory, New Delhi, Vikas, 1983.

J. Waldron (ed.), Theories of Rights, New Delhi, Oxford University Press, 1984.

I. Wallerstein, The Modern World System (3 Vols., 1974, 1980, 1989), New York, Academic Press, 1974.

S. Wasby, Political Science: The Discipline and its Dimensions, Calcutta, Scientific Book Agency, 1970.

S. Wolin, 'Political Theory as a Vocation', American Political Science Review, 1969, LXII, pp. 1062-82.

S. Wolin, "Political Theory: From Vocation to Invocation", in: Vocations of Political Theory, (eds.), J.A. Frank and J. Tambornino, Minneapolis, London, University of Minnesota Press, 2000.

Abbas, Political Theory, Pearson 2011.

General Paper G-2 (OR)

GOVERNMENT AND POLITICS OF U.K., U.S.A

(80-20 Pattern to be implemented from 2014-2015)

Course Objectives:

This paper studies the major constitutions of the World by adopting a comparative approach. The constitutional and legal provisions, the ideological basis, the institutional arrangement and their social and economic background are to be explained, analyzed and evaluated critically. The historical backgrounds to individual constitutions are to be emphasized to gain an understanding of its evolution. The comparative perspective enables the student to understand the differences and similarities between the various constitutional arrangements. Furthermore the political institutions are to be studied in light of the political process to gain an understanding of the dynamics of actual politics and policy making.

Term-I

Weightage

Unit: 1 - Constitutions **12**

Nature and Evolution (U.S.A, U.K)

Unit: 2 - Legislature **12**

Parliament (UK): Structure, powers & Role
Congress (USA): Structure, powers & Role

Unit: 3- Executive **12**

Prime Minister & Cabinet (U.K),
President and Cabinet (U.S.A)

Unit: 4- Judiciary **12**

Nature, Power & Functions of Judiciary (U.K & U.S.A)

Term-II

Unit: 5- Political Parties **12**

Political Parties: Relation between political parties & government.
Two party system, features and role of parties in UK, USA

Unit: 6- Interest groups **12**

Interest groups: their roles and performance in UK and USA

Unit: 7- State Governments **12**

State Governments in UK and USA

Unit: 8- social movements **12**

Social Movements: Human Rights, Women's Movement,
Ethnic Movements

Readings:

Palshikar Suhas & Yashwant Sumant, 1988, Government of USA, Nirali, Pune **(Marathi book)**.

Bhole B, 2004, Government & Politics: Comparative Study, Pimpalapure Pub. Nagpur **(Marathi book)**.

G. Almond et.al., Comparative Politics Today: A World View, 7th edn., New York, London, Harper/Collins, 2000.

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A. H. Birch, British System of Government, 4th edn., London, George Allen and Unwin,1980.

H. Finer, Theory and Practice of Modern Government, London, Methuen, 1969.

J. Flammang et.al., American Politics in a Changing World, Pacific Groove California, Brooks Cole, 1990.

E. S. Griffith, The American System of Government, 6th edn, London, Methuen, 1983.

G. Jones (ed.), West European Prime Ministers, London, Frank Cass, 1991.

D. Kavangh, British Politics: Continuity and Change, Oxford, Oxford University Press, 1985.

H.J. Laski, American Democracy: A Commentary and An Interpretation, London, Unwin,1948.

C. Leys, Politics in Britain: An Introduction, London, Heinemann, 1983.

R. Neustadt, Presidential Power and the Modern Presidents, New York, The Free Press, 1991.

H. G. Nicolas, The Nature of American Politics, 2nd edn., Oxford, The Clarendon Press,1986.

R. Rose, Politics in England: An Interpretation for the 1980s, Boston, Little Brown, 1980.

A. de Tocqueville (1886), Democracy in America, 2 Vols., Bombay, Popular, 1964.

K. C. Wheare, Federal Government, 4th edn., Oxford and New York, Oxford University Press, 1963.

J. Wilson, American Government, 4th edn., Boston Massachusetts, Houghton Miffin, 1997.

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S.Y.B.A Political Science

Special Paper-I

WESTERN POLITICAL THOUGHT

(80-20 Pattern to be implemented from 2014-2015)

Course Objectives:

This paper studies the classical tradition in political theory from Plato to Marx with the view to understand how the great Masters explained and analyzed political events and problems of their time and prescribed solutions. The texts are to be interpreted both in the historical and philosophical perspectives to understand the universality of the enterprise of political theorizing. The limitations of the classical tradition, namely its neglect of women's concerns and issues and the non-European world are critically examined. The legacy of the thinkers is explained with the view to establish the continuity and change within the Western political tradition.

Term-I	**Weight age**
Unit: 1 - Plato	**12**
a) Ideal State & Philosopher King	
b) Views on Education	
c) Views on Justice & Communism	
Unit: 2 - Aristotle	**12**
a) Views on State	
b) Views on Property, Views on Slavery	
c) Views on Revolution	
Unit: 3 - Machiavelli	**12**
a) Views on Human Nature	
b) Views on Religion & Morality	
c) Theory of Statecraft	
Unit: 4 – J.S.Mil	**12**
a) Views on Utilitarianism	
b) Views on Liberty	
c) Views on Representative Government & State	
Term-II	
Unit: 5 – Karl Marx	**12**
a) Historical Materialism	
b) Theory of Class & Struggle	
c) Theory of State & Revolution	
Unit: 6 - Hobbes	**12**
a) State of Nature	
b) Views on Human Nature	
c) Theory of Social Contract	

Unit: 7 – John Locke **12**

a) Theory of Social Contract
b) Views on natural Rights
c) Views on civil society & State

Unit: 8 - Rousseau **12**

a) State of Nature & Views on Human Nature
b) Theory of General Will
c) Theory of Social Contract

Readings:

Shefali Jha, Western Political Thought from Plato to Marx, Pearson, 2012

Biran R. N., Western Political Thought from Socrates to the Age of Ideology, Pearson 2008.

Garde D.K, 1977, Western Political Thought, Rane Pub.Pune (**Marathi Book**).

Sakalkar E. & Ashok Jain, 1990, Western Political Thought, Sheth Pub.Pune (**Marathi Book**).

Deo Vijay, Sharad Gosavi & Sanjoyt Apte, 2012, Western Political Thought, Diamond Pub. Pune **(Marathi Book)**

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, The Politics of Aristotle, translated with introduction, notes and appendix, Oxford, Oxford University Press, 1995.

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L. Colletti, From Rousseau to Lenin: Studies in Ideology and Society, translated by

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P. Laslett, John Locke's Two Treatises of Government, Cambridge, Cambridge University Press, 1960.

R. B. Levinson, In Defense of Plato, Cambridge Massachusetts, Harvard University Press, 1953.

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S. Mukherjee and S. Ramaswamy, A History of Political Thought: Plato to Marx, New Delhi, Prentice Hall, 1999.

R. G. Mulgan, Aristotle's Political Theory: An Introduction for Students of Political Theory, Oxford, The Clarendon Press, 1977.

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J. Tully, A Discourse on Property: John Locke and his Adversaries, Cambridge, Cambridge University Press, 1980.

N. Warburton, J. Pike and D. Matravers, Reading Political Philosophy: Machiavelli to Mill, London, Routledge in association with Open University, 2000

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S.Y.B.A Political Science

Special Paper-II

POLITICAL SOCIOLOGY

(80-20 Pattern to be implemented from 2014-2015)

Section I

1. Definition, Nature and Scope of Political Sociology

2. Intellectual Foundation of Political Sociology

a) Marx b) Max Weber c) Behavioral Approach

3. Political Culture.

a) Meaning and Nature
b) Types of Political Culture

4. Political Socialization

a) Process and Agencies of Socialization

Section II

5. Political Ideology

a) Meaning and Nature

6. Political Participation

a) Meaning and Nature
b) Levels of Participation
c) Agencies of Recruitment

7. Legitimacy and Influence

a) Meaning and Nature
b) Types

8. Political Change, Political Development.

a. Meaning and Nature
b. Types of Political Change
c) Concept of Political Development

Readings

1. Awari Vilas, Devare Suresh Adhunik Rajakiya Vishleshan, Dimond pune.
2. Chavan Shankar Rajkiya Tatvapranali, Pratima Pub. Pune.
3. Rush M. and P. Althof : An Introduction to Poitical Sociology, Flecher, London.
4. Varma S. P.: Modern Political Theory, Vikas Publication, New Delhi.
5. Bottomere T. B. : Political Sociology, B1 Publication, Bombay.

6. Nash Kate : Contemporary Political Sociology, Blackwell Publishers, UK.
7. Coser Lewis (ed.) Political Sociology, Selected Essays, Harper and Row, New York, 1967.
8. Wasburn P. C.: Politics and Society, Prentice Hall, 1982.
9. Samir Das : Political Sociology, Pearson, 2012.

Savitribai Phule Pune University

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Ref.BCUD/ 76

Dt. 18.03.2015

To,
The Principal/ Directors.
All Affiliated colleges
All Recognized institute
Savitribai Phule Pune University,
Pune

Subject: Guidelines regarding evaluation of Cyber security courses of 4 credits.

Dear Sir/Madam,

As per decision taken by the University authorised, Cyber Security courses of 4 credits has been incorporated in the syllabi of Post graduate courses. We hereby, would like to give the guidelines for the evaluation of these courses. We hereby, would like to give the guidelines for the evaluation of these courses attached herewith.

With regards,

Dr. V. B. Gaikwad
Director, BCUD

GUIDELINES FOR EVALUATION OF CYBER SECURITY COURSES OF 4 CREDITS

From the academic year 2014-15, the cyber security courses for 4 credits have been incorporated in the curriculum of Post-graduate degree programmes of Savitribai Phule Pune University.

- Cyber security courses has been divided into 4 modules namely :

Name of Modules	No. Of credit	No. Of hours	No of Marks
Module : 1 Pre-requisites in Network and Information Security	One credit	14	25
Module : 2 Security Management	One credit	13	25
Module : 3 Information and Network Security	One credit	13	25
Module:4 System and Application Security	One credit	20	25

- Evaluation comprises of the Internal Assessment of the aforesaid modules are on the basis of following components:

Name of module	Examination pattern		Marks	
Module 1	Written Examination	Objective questions, MCQs, define/answer in one sentence	7	15
		Two descriptive questions of short answers	8	
	Hands on /Practical examination along with viva			10
			Total	25
Module 2	Written Examination	Objective questions, MCQs, define/answer in one sentence	7	15
		Two descriptive questions of short answers	8	
	Hands on /Practical examination along with viva			10
			Total	25
Module 3	Written Examination	Objective questions, MCQs,	7	15

		define/answer in one sentence		
		Two descriptive questions of short answers	8	
	Hands on /Practical examination along with viva			10
			Total	25
Module 4	Written Examination	Objective questions, MCQs, define/answer in one sentence	7	15
		Two descriptive questions of short answers	8	
	Hands on /Practical examination along with viva			10
			Total	25
GRAND TOTAL				**100**

- Course- related skill-based practical work will be entirely based on the skills to be developed in the students. It may include the topics as has been prescribed in the syllabi of every module.
- Practical components may be based on laboratory work, on job industrial training, working with NGO or similar organizations, project, group discussion, presentation etc. unless otherwise clearly specified in the given syllabi of all the courses.
- College is supposed to maintain the record of marks allotted to the practical work carried out by the students.
- There shall be combine passing (written exam + practical, viva) of 40%.

Savitribai Phule Pune University

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Ref.BCUD/ 77

Dt. 18.03.2015

To,
The Principal/ Directors.
All Affiliated colleges
All Recognized institute
Savitribai Phule Pune University,
Pune

Subject: Guidelines regarding evaluation of Human Rights Education Programme (2 credits)

Dear Sir/Madam,

As per decision taken by the University authorised, Human Education Programme of 2 credits has been incorporated in the syllabi of Post graduate courses. We hereby, would like to give the guidelines for the evaluation of these courses attached herewith.

With regards,

Dr. V. B. Gaikwad
Director, BCUD

GUIDELINES FOR EVALUATION OF HUMAN RIGHTS EDUCATION PROGRAMME FOR 2 CREDITS

- Students of all the Post graduate programmes have to undergo the Human Rights Education programme

- The Courses under the programme will have no affect on the credit/grade of the students of their regular course of study. The grades earned in the papers of this programme will reflect separately in the mark statement of each student.

- In the HRE Programme there will be three courses.

Paper code	Course Name	Credits	Marks
HRE 101	Introduction to Human Rights and Duties (Mandatory)	1	25
HRE 102	Human Rights of Vulnerable and Disadvantaged Groups (Optional)	1	25
HRE: 103	Human Rights and Duties in India: Law, Policy, Society and Enforcement mechanism. (Optional)	1	25

- In the three courses, students have to opt for only two courses during their entire Post Graduate Programme Among the three papers, **(HRE 101 Introduction to Human Rights and Duties**) is a compulsory course. In the other two papers (**HRE 102 Human Rights of Vulnerable and Disadvantaged Groups and HRE 103 Human Rights and Duties in India: Law, Policy, Society and Enforcement Mechanism)** the students are free to select any one paper as per the decision of the head of the institute.
- At no point of time any two courses should be taken together. (This rule is applicable for the students in part I or from the new academic year).

- The Coordinators of each institute appointed by the Directors/Principal shall monitor the programme under the Supervision of the Head of the institute.

- It would be a self-study programme. The students will have to study the materials of each paper, based on the materials uploaded on the University Website. Apart from the materials available on the website, students are free to refer to any reference book of their choice stated in the bibliography. Apart from the reading materials, a video of Lectures delivered by some of the eminent professors will also be available on the University Web Site.

- For evaluation of the papers, any of the models prescribed in the credit pattern for Internal Assessment regulations may please be adopted depending on the Models suitable to the institute.

- Individual faculty member shall have the flexibility to design the concurrent evaluation components in a manner so as to give a balanced assessment of student capabilities across Knowledge, Skills and Abilities based on following assessment tools:
  1. Case Study/ Caselet/ Situation Analysis
  2. Class Test
  3. Open book test
  4. Study tour/ Field visit and report of the same.
  5. Small group Project
  6. Group Discussion
  7. Role Play/ Story telling
  8. Thematic Presentation
  9. Industry Analysis
  10. In depth viva
  11. Quiz
  12. Model Development / Simulation exercises

- A pass in the two papers is compulsory.

- Each Paper carries only One Credit. This means a credit is equal to 25 marks. Hence, the minimum applicable per credit as per the credit system rules need to be adopted as the passing minimum. Based on the marks that are secured by each student the grade may be decided depending on the mark obtained in each paper.

- If any student fails to secure the minimum passing grade of E in any of the two papers, such student may have to repeat such paper and has to pass the paper compulsorily otherwise they won't be conferred the degree.

- The Coordinators of each institute need to maintain a record of the evaluation methods adopted by the respective institute.