M. S. P. MANDAL'S

DEOGIRI COLLEGE, AURANGABAD

INTERNAL QUALITY ASSURANCE CELL

Course Outcomes (COs)

INTENRAL QUALITY ASSURANCE CELL

Course Outcomes (COs)

INDEX

Course Outcomes

COs: Marathi

B. A. Marathi F.Y B.A, B.Sc. Marathi Paper I & II (S.L) Gadya Padya Upyojit Marathi

CO1: To introduce learners to the literature of the writers from medieval and modern time.

CO2: To make learners aware of social, political, cultural and economic conditions of the times.

CO3: To introduce the style of prose, fiction and poetry.

CO4: To understand Marathi grammar and punctuations.

CO5: To develop language skills for media.

F.Y. B.Com Marathi Paper I (S.L.) Gadya Padya Ani Upayojit Marathi

CO1: To introduce learners to poetry.

CO2: To understand real facts in dialogue, sentence and phrases.

CO3: To understand philosophy of Marathi literature.

CO4: To develop and enhance thinking, reasoning and communications skills.

CO3: To develop writing and expressing the views.

F.Y.B.A Marathi Paper I (Opt.) Kavytmak Sahitya

CO1: To introduce students to Marathi Poetry.

CO2: To understand Marathi poetry & connect it to real life.

CO3: To understand various ideologies, movements in the history of Marathi poetry.

CO4: To study the importance of literature.

F.Y.B.A Marathi Paper II (Opt) NATYATMAK WANGMAY

CO1: To understand Marathi language and drama.

CO2: To acquire and understand realistic view of life.

CO3: To express the fabulous dramatics.

CO4: To enhance expression, thoughts, ideas and all characteristic of human humanities through drama.

CO5: To correlate drama with our life and to know the social religious issues.

F.Y. BA Marathi Paper III (Opt.) Kathatmak Sahitya

CO1: To introduce students to Marathi story literature.

CO2: To enhance learner's interest in Marathi stories & connect it to real life.

CO3: To understand ideologies and movements in the history of Marathi language & literature.

CO4: To understand importance of literature in life.

F.Y. B.A. Marathi Paper IV (Opt) MUDRIT MADHAMASATHI LEKHAN KAUSHALUA

CO1: To understand communication skills.

CO2: To acquire realistic view in Marathi literature.

CO3: To understand the importance of language sources like television, mobile, newspaper and magazine.

CO4: To know the outer world.

CO5: to provide opportunities in services in mass media.

S.Y. B.A, B.Sc. Marathi Paper III&IV (Gadya Padya Upyojit Marathi)

CO1: Students will get introduced to thoughtful writings.

CO2: To create awareness about meaning and history of folk culture.

CO3: To introduce different trends in literature.

CO4: To understand of literary analysis.

CO5: To apply literary syntax of Marathi language.

CO6: To enhance interest of learner in Marathi literature, different Ideology and types.

CO7: To introduce information technology and social news in media.

CO8: To develop art of living through literature.

CO9: To understand literature, science, official transactions.

S.Y.B. COM Marathi Paper II (S.L) Marathi bhasha ani vanijya vhavhar

CO1: To impart knowledge of Marathi language of commerce & business.

CO2: To understand use of language in offices, commerce field and business sector.

CO3: To understand the need and structure of language.

CO4: To develop writing skill of commerce language.

CO5: To enhance competency through reading culture.

S.Y. B.A. Marathi Paper V (Opt.) Aadhunik Marathi vangmayacha itihas. (1800-1920)

CO1: To study literature history after 1800.

CO2: To correlate social, cultural, social movement ideology during 1800-1920 on literature.

CO3: To understand the background, inspiration, importance of authors & their literary work in 1800-1920.

CO4: To study translated literature & different types of literature including periodic, story, poetry, novel, biography, autobiography.

S.Y.B.A, Marathi Paper Paper VI, VIII (Druk shravya Madhyamansathi lekhan kaushalya)

CO1: To introduce functioning and structure of radio language.

CO2: To acquire skills of radio anchor.

CO3: To understand production of different programmes on radio.

CO4: To know different websites and webpages for media purposes.

CO5: To develop critical thinking.

S.Y.B.A. Marathi Paper VII (Opt.) Aadhunik Marathi vangmayacha itihas. (1800-1920)

CO1: To introduce learners to theatre culture, tradition, development and emergence of Marathi theatre.

CO2: To familiarize with Annasaheb kirloskar and his contribution.

CO3: To study translated literature & different types of literature such as periodic, story, poetry, novel, biography and autobiography.

CO4: To study poetry, biography, autobiography and their specialty. Keshavasut (Father of modern Marathi poetry) and his contemporary.

T.Y.B.A. Marathi Paper IX & XIII (OPT) (Bhartiy aani pashchimatya sahitya vichar)

CO1: To introduce students with basic scientific - Indian and foreign literature.

CO2: To understand types of literature.

CO3: To develop clear concepts in literature.

CO4: To learn conveying of message through Marathi literature.

CO5: To learn various forms of realistic human character.

T.Y.B.A, Marathi Paper, X, XIV (Opt.) (Bhasha Vidnyan: Vyakran v Nibandha)

CO1: To create awareness about the structural patterns of sounds in Marathi.

CO2: To inculcate ideas about history and development of Marathi language and its spoken forms.

CO3: To understand Marathi grammar.

CO4: To enhance pronunciation skill.

CO4: To understand Marathi grammar in various forms - word formation, suffix & prefixes.

CO5: To introduce learners to dialects of Marathi language.

T.Y. B.A. Marathi Paper XI (MAIN) Madhyayugin Marathi vangmayacha itihas. (Start to 1600)

CO1: To understand different ages of Marathi.

CO2: To understand Mahanubhav Sect and their contribution in Marathi literature.

CO3: Specialty of ideology, philosophy of mahanubhav sect & their literary work.

CO4: To understand contribution of Varkari sampraday (sects) and their literary work.

T.Y. B.A. Marathi Paper XI (MAIN) Madhyayugin Marathi vangmayacha itihas. (1601 - 1818)

CO1: To understand Panditi sahitya and their inspiration, specialty and structure.

CO2: To know pandit kavi and his literature.

CO3: To understand contribution of Shahiri literature, inspiration, structure and specialty.

T.Y.B.A. Marathi Paper XII & XVI (Main Project)

After completion of the course, learners will be able to .....

CO1: Convey massage or motto with a story.

CO2: To think independently.

CO3: To apply logic.

CO4: To enhance thinking ability and create interest in Marathi language.

M. A. Marathi 101. Adhunik Marathi wanngmayacha Itihas

CO1: To create the interest in modern history in Marathi literature.

CO2: To cultivate and enhance interest in Marathi literature among the learners.

CO3: To enable learners for competitive examinations.

CO4: To create the interest in literature self-learning.

CO5: To develop the comparative study on the Literature.

Sahitya Samikshechi Multatwe

CO1: To create the most valuable evaluate the literature.

CO2: To develop the real fact of Marathi literature.

CO3: To develop criticize skills.

CO4: To develop the criticize review of book, cinema and drama.

CO5: To introduce to various types of *samiksha.*

103. Bhashik kaushalya, Prasar Madheme wa Srujansheel Lekhan

CO1: To create interest in literature.

CO2: To develop reading, writing and lessoning skills.

CO3: To develop skillful anchor on radio, television and radio.

CO4: To develop creative writer.

CO5: To create socially valuable reporter, sub editor and rural journalist.

104. Eka Lekhakacha Visesha abhyas Audhinik: Yaswantrao Chavan

CO1: To create interest in special author in literature.

CO2: To understand and solve problems in life.

CO3: To face challenges and overcome them through literature study.

CO5: To introduce students with basic writing and reading skills.

M.A. Marathi Paper II Year

401. Wananatamk Bhasa Vidhyan

CO1: To develop the Nature of language on Marathi literature.

CO2: To make the students aware of the language skills.

CO3: To develop the linguistic approach.

CO4: To encourage and enable the students to read the various types of language.

CO5: To impart the skills and thinking ability.

402. Adhunik Marathi wangmayatil pravaha

CO1: To develop learner's interest in new trends in modern Marathi in literature.

CO2: To create interest in Marathi literature through reading books.

CO3: To introduce various types of literature.

CO4: To develop the bright thinking for Marathi novel and poem.

CO5: Encourage the read for inter disciplinary literature.

403. Folk literature

CO1: To develop the review of socialist folk literature.

CO2: To create interest in Marathi folk literature to students.

CO3: To make aware the learners about different areas of folk literature.

CO4: To connect folk literature with real life situation.

CO5: To introduce various types of areas folk literature.

404. Marathwadyatil adhunik sahitya

CO1: To understand the various movements of Marathwada region.

CO2: To develop modern Marathwada literature.

CO3: To introduce learners with various types of Marathwada literature.

CO4: To impart skill and develop thinking ability.

COs: Hindi

बी. ए.

सामान्य हिंदी (SL – I & II) (बी.ए., बी. कॉम., बी. एस्सी.)

CO1: मानवीय संवेदनाओं का विकास हो जाता है और इंसानीयत को बढावा मिलता है।

CO2: हिंदी कहानी साहित्य का परिचय मिल जाता है।

CO3: हिंदी के प्रमुख लेखक और और उनकी लेखन विशेषताओं का परिचय प्राप्त होता है।

CO4: विद्यार्थिओं के भाषा कौशल का विकास होता है।

CO5: विद्यार्थिओं में हिंदी भाषा के महत्त्व के साथ व्याकरणिक सजकता निर्माण होती है।

प्रश्नपत्र 1 – उपन्यास साहित्य

CO1: विद्यार्थियों की साहित्यिक अभिरूचि का विकास और साहित्य आस्वादन का आनंद देना।

CO2: इंसानी जीवन मूल्यों का विकास और उनके प्रति आस्था निर्माण करना।

CO3: उपन्यास साहित्य की बारिकियों से परिचित करना और हिंदी उपन्यास साहित्य की पहचान करना।

CO4: लेखन और भाषा कौशल का विकास करना।

प्रश्नपत्र 2 – नाटक साहित्य

CO1: हिंदी नाटकों और उसके बहाने साहित्य में नाट्य परंपरा, हिंदी रंगमच, अभिनय तथा व्यावसायिक नाटकों से परिचित करना।

CO2: 'विजयपर्व' नाटक से अशोक की जिंदगी का संघर्ष, युवराज से राजगद्दी और फिर राजगद्दी से निर्वाण तक के सफर का प्रयास युद्ध से शांति भली है की स्थितियों को बयां करता है। अतः विद्यार्थियों पर संघर्ष, रक्तपात, लडाई से शांति भली है के संस्कार हो जाता है।

CO3: 'होरी' नाटक प्रेमचंद का है। इस नाटक के अध्ययन के पश्चात् किसानों की दयनीयता, जमीन से जुडना, पारिवारिक संघर्ष आदि का परिचय मिला। विद्यार्थी भी पहले से किसान परिवारों से जुडे हैं, अतः 'होरी' नाटक में चित्रित पात्र उन्होंने अपने घरों में बसे हैं ऐसा एहसास किया है। बिना पढाई के क्या होता है इसका परिचय भी पाया है। अतः शिक्षा से आत्मनिर्भर बनने की प्रेरणा, सम्मान पाने की लालसा विद्यार्थियों में जगती है।

CO4: 'अलख आजादी की' नाटक भारतीय स्वतंत्रता का लेखा-जोखा प्रस्तुत करता है। आज जिस देश में हम रह रहे हैं, वह कहां से कहां तक का सफर कर चुका है, इससे विद्यार्थी परिचित हो गए हैं। घर-गांव और देश के प्रति देशभक्ति के भाव विद्यार्थियों में जगाने का काम इस नाटक से होता है।

CO5: 'नाटक साहित्य' पेपर के अध्ययन के बाद विद्यार्थियों में हिंदी नाटक साहित्य की बारिकियों को पहचानने की क्षमता का विकास, संवेदनाओं का विकास, नाट्य आस्वादन और नाटकों की आलोचना करने की दृष्टि का विकास हो गया है।

प्रश्नपत्र 3 – हिंदी गद्य साहित्य

CO1: हिंदी कहानी और व्यंग्य साहित्य का अध्ययन करना।

CO2: इंसानी जीवन मूल्यों और संवेदनाओं का विकास और उनके प्रति आस्था निर्माण करना।

CO3: साहित्य आस्वादन और मूल्यांकन क्षमता का विकास करना।

CO4: हिंदी साहित्य की गद्य विधाओं का परिचय करवाना।

प्रश्नपत्र 4 – एकांकी साहित्य

CO1: एकांकी नाटक की तुलना में छोटी विधा है। प्रथम सत्र में नाटकों का अध्ययन और द्वितीय सत्र में एकांकी का अध्ययन है। इससे विद्यार्थियों को नाटक और एकांकी के बिच का फर्क समझ में आता है।

CO2: हिंदी एकांकी के उद्भव और विकास से विद्यार्थी परिचित होता है।

CO3: एकांकी के माध्यम से मानवीय संवेदनाओं का अध्ययन हो गया और जीवन में मानवीय मूल्यों से विद्यार्थी परिचित हो गए। छोटी-छोटी घटनाओं का जीवन में क्या महत्त्व है, इसका परिचय भी विद्यार्थियों को हो गया है।

CO4: 'एकांकी नए पुराने' किताब के भीतर पांच प्रतिनिधिक एकांकियों को पढाई के लिए रखा है, जिससे ऐतिहासिक, सामाजिक और समस्यामूलक एकांकी कैसे होती है, इसका ज्ञान विद्यार्थियों को होता है।

CO5: 'प्रतिनिधिक महिला एकांकी'हिंदी महिला एकांकीकारों की एकांकियों का प्रतिनिधित्व करती है। महिलाओं के अनुभव जगत का बयान करता यह एकांकी संग्रह महिलाओं की मुश्किलों और पीडाओं को विद्यार्थियों के सामने रखता है। अर्थात इससे विद्यार्थी अपने घर-परिवार में रह रही महिलाओं के मुश्किलों से परिचित हो गए हैं।

सामान्य हिंदी (SL – III & IV) (बी.ए., बी. कॉम., बी. एस्सी.)

CO1: साहित्य आस्वादन अभिरूचि का परिसंस्कार करना।

CO2: जीवन मूल्यों के प्रति आस्था निर्माण करना।

CO3: हिंदी के आधुनिक गद्य साहित्य की प्रतिनिधिक रचनाओम का परिचय करना ।

CO4: अत्याधुनिक इलेक्ट्रॉनिक माध्यमों का परिचय करना।

CO5: व्यावहारिक, प्रयोजनमूलक तथा संप्रेषणमूलक व्यावसायिक हिंदी भाषा से विद्यार्थी परिचित हो और रोजमर्रा की जिंदगी में अपनी मांगों को पूरा करने में सक्षमता पाए यह अपेक्षा भी इस पाठ्यक्रम की रही है।

CO6: पत्रलेखन के सारे प्रकार, आवेदन पत्र, बैंकिंग तथा सरकारी कार्यालयों की प्रयोजनमूलक भाषा से विद्यार्थी परिचित होता है।

CO7: हिंदी साहित्य की कहानी, कविता, संस्मरण, रेखाचित्र, डायरी, आत्मकथा, जीवनी, निबंध, यात्रावृत्त, व्यंग्य, रिर्पोताज, पत्र आदि विधाओं का परिचय भी विद्यार्थी कर चुके हैं। जीवन मूल्य, भाव-भावनाओं, संवेदनाओं के परिचय के साथ आधुनिक साधनों का भाषाई प्रयोग कैसे करे इसका परिचय भी विद्यार्थी पाते हैं।

CO8: रेडियो वार्ता लेखन, समाचार लेखन, मीडिया के विविध आयाम, हिंदी भाषा की व्यावसायिक उपयोगिता, बैंकों में हिंदी, वैश्वीकरण के परिप्रेक्ष्य में हिंदी भाषा का महत्त्व, उद्योग-व्यापार में हिंदी के सहारे कैसे आर्थिक प्रगति कर सकते हैं आदि बातों का परिचय करवाना।

प्रश्नपत्र 5 – कथेत्तर गद्य साहित्य

CO1: कथेत्तर गद्य साहित्य पेपर रखने का उद्देश्य यहीं है कि हिंदी के विद्यार्थी हिंदी साहित्य के कथेत्तर विधाओं से परिचित हो।

CO2: 'गद्य गौरव' और 'गद्य प्रभा' किताब के माध्यम से विद्यार्थी रेखाचित्र, निबंध, संस्मरण, जीवनीपरख लेख, व्यंग्य, आत्मकथा अंश, यात्रा वृतांत, लेख आदि विधाओं से भलीभांति परिचित हो।

CO3: साहित्य के विविध विधाओं के आस्वादन का आनंद लेने की आदत और अभिरुचि विकास भी विद्यार्थियों में करना।

CO4: हिंदी कथेत्तर गद्य संवेदना की परंपरा का परिचय करना।

CO5: जीवन मूल्यों के प्रति आस्था पैदा करना।

प्रश्नपत्र 6 – प्रयोजनमूलक हिंदी 1

CO1: हिंदी भाषा के प्रयोजनमूलक रूप का परिचय करना।

CO2: हिंदी भाषा की व्यावहारिकता पर प्रकाश डालना।

CO3: भारत देश की राष्ट्रभाषा होने के नाते हिंदी भाषा की एहमीयत का मूल्यांकन करना।

CO4: हिंदी के राष्ट्रीय और आंतर्राष्ट्रीय स्वरूप का मूल्यांकन करना।

CO5: आधुनिक तंत्र विज्ञान में हिंदी की उपयोगिता पर आकलन करना।

प्रश्नपत्र 7 – आधुनिक हिंदी कविता

CO1: हिंदी साहित्य के पद्य (कविता) के उद्भव और विकास पर प्रकाश डालना, हिंदी कविता के प्रति विद्यार्थियों की अभिरुचि की वृद्धि करना, मानवीय भाव-भावनाएं और संवेदनाओं का विकास करना इस पाठ्यक्रम का उद्देश्य है।

CO2: नागार्जुन द्वारा लिखित खंडकाव्य 'भूमिजा' रामायण के कथा प्रसंग पर प्रकाश डालता है। सीता का ऐतिहासिक मूल्यांकन करते हुए एक नारी के नाते उसकी कौनसी शिकायतें राजा, पति, पुरुष और राज्य के प्रति रही है इसका लंबा मूल्यांकन करना। अर्थात नारी जीवन के संघर्ष और विद्रोह का परिचय इस खंडकाव्य का उद्देश्य है।

CO3: विद्यार्थी 'रामायण', 'रामचरितमानस' तथा अन्य रामायण कथा पर केंद्रित रचनाओं से एक अलग रचना से परिचित हो गए हैं, जिसमें सीता का एक स्त्री होने के नाते पुरुषों के प्रति विद्रोह है इसका परिचय करवाना।

CO4: 'चुनी हुई लंबी कविताएं' पढाई हेतु रखी है। कविता और खंडकाव्य के बिच का साहित्यिक पद्य रूप के नाते लंबी कविताओं को जाना जाता है। इन कविताओं के माध्यम से विद्यार्थी विविध भाव, रस से परिचित हो गए हैं। साथ ही आधुनिक जीवन की परेशानियों, भ्रमभंग, बाजारीकरण, अर्थसत्ता का ताकतवर होना, शब्दों की एहमीयत आदि बातों का परिचित करवाना।

प्रश्नपत्र 8 – प्रयोजनमूलक हिंदी 2

CO1: हिंदी भाषा के विविध रूपों का परिचय करना।

CO2: राजभाषा हिंदी के विविध रूपों का परिचय करना।

CO3: प्रयोजनमूलक भाषा तथा अनुवाद की भूमिका का परिचय करना।

CO4: हिंदी भाषा के प्रयोजनमूलक और व्यावहारिक रूप का परिचय करना।

CO5: भारत देश की राष्ट्रभाषा होने के नाते हिंदी भाषा की एहमीयत का मूल्यांकन करना।

CO6: हिंदी के राष्ट्रीय और आंतर्राष्ट्रीय स्वरूप का मूल्यांकन करना।

CO7: आधुनिक तंत्र विज्ञान में हिंदी की उपयोगिता पर आकलन करना।

प्रश्नपत्र 9 – प्रादेशिक साहित्य

CO1: साहित्य आस्वादन और अभिरूचि का परिष्कार करना।

CO2: जीवन मूल्यों के प्रति आस्था निर्माण करना।

CO3: प्रादेशिक भाषा के साहित्य से परिचय करवाना।

CO4: भारतीय साहित्य का अध्ययन करना।

प्रश्नपत्र 10 – आदि तथा मध्यकालीन हिंदी साहित्य का इतिहास

CO1: हिंदी साहित्य के इतिहास तथा आरंभिक काल का परिचय करना।

CO2: हिंदी साहित्य के लेखन स्रोतों एवं परंपराओं पर प्रकाश डालना।

CO3: हिंदी साहित्य आदिकाल, भक्तिकाल और रीतिकाल का परिचय देना।

CO4: साहित्य आस्वादन और अभिरूचि का परिष्कार करना।

CO5: जीवन मूल्यों के प्रति आस्था निर्माण करना।

प्रश्नपत्र 11 – साहित्यशास्त्र

CO1: साहित्य चिंतन परंपरा का अध्ययन करना।

CO2: साहित्यालोचन क्षमता का परिचय करना।

CO3: साहित्य सृजन के संस्कार करना।

CO4: साहित्य एक प्रकार से शास्त्र है, उसका पढना, चिंतन, आकलन, मूल्यांकन और सृजन करना एक प्रकार की शास्त्रीय तकनीक है। इसी तकनीक का विकास करना इस पाठ्यक्रम का उद्देश्य है।

CO5: साहित्य का स्वरूप, तत्त्व, प्रयोजन, हेतु, शब्दशक्तियां, रस, अलंकार, छंद, विविध विधाओं का स्वरूप, आलोचना आदि अंगों का परिचय विद्यार्थियों को करवाना।

CO6: साहित्य और हिंदी भाषा के विद्यार्थी होने के नाते एक परिपूर्ण इंसान बनने और मानवीय जीवन का आकलन, बोध और मूल्यांकन करने की क्षमता का विकास हो यह इस पाठ्यक्रम का उद्देश्य है, अर्थात 'साहित्यशास्त्र' इस पाठ्यक्रम की पढाई के बाद यह दृष्टि विद्यार्थियों लाना।

CO7: साहित्य का मूल्यांकन करने का नजरिया भी विकसित करना। साहित्य के कलापक्षीय अंगों पर प्रकाश डालने की दृष्टि का विकास करना।

प्रश्नपत्र 12 व 16 – प्रकल्प कार्य

CO1: पठन-पाठन और लेखन कौशलों का विकास करना।

CO2: आलोचनात्मक क्षमता का विकास करना।

CO3: अनुसंधात्मक दृष्टि का विकास करना।

CO4: प्रकल्प प्रस्तुति का तकनीक से परिचित करना।

प्रश्नपत्र 13 – मध्यकालीन काव्य

CO1: भारतीय भक्ति आंदोलन का अध्ययन करना।

CO2: रीतिकालीन संवेदनाओं का अध्ययन करना।

CO3: कविताओं के माध्यम से मध्यकालीन सांस्कृतिक संवेदना का अध्ययन करना।

CO4: भक्ति तथा रीतिकालीन पृष्ठभूमि और प्रवृत्तियों से विद्यार्थियों को परिचित करना।

CO5: साहित्य का चिंतन, आकलन और मूल्यांकन करना एक प्रकार की शास्त्रीय तकनीक है। इसी तकनीक का विकास करना इस पाठ्यक्रम का उद्देश्य है।

प्रश्नपत्र 14 – आधुनिक हिंदी साहित्य का इतिहास

CO1: हिंदी साहित्य के आधुनिक काल का परिचय करना।

CO2: हिंदी साहित्य के आधुनिक काल की पृष्ठभूमि और प्रवृत्तियों पर प्रकाश डालना।

CO3: हिंदी साहित्य के आधुनिक काल में कविता और गद्य लेखन के विविध प्रकारों का आकलन और मूल्यांकन।

CO4: भारतीय स्वातंत्रता संग्राम में हिंदी साहित्यकारों ने कौनसी भूमिका निभाई और देशभक्ति से प्रेरित होकर कितना साहित्य लिखा इसका मूल्यांकन करना।

CO5: हिंदी साहित्य के सामाजिक और आधुनिक पहलुओं पर प्रकाश डालना।

प्रश्नपत्र 15 – साहित्यशास्त्र

CO1: साहित्य चिंतन परंपरा का अध्ययन करना।

CO2: साहित्यालोचन क्षमता का परिचय करना।

CO3: साहित्य सृजन के संस्कार करना।

CO4: साहित्य के रस, अलंकार, छंद, विविध विधाओं का स्वरूप, आलोचना आदि अंगों का परिचय विद्यार्थियों को करवाना।

CO5: साहित्य की विविध विधाओं से विद्यार्थियों को परिचित करवाकर उसका तात्विक अध्ययन करना।

CO6: साहित्य का मूल्यांकन करने का नजरिया भी विकसित करना। साहित्य के कलापक्षीय अंगों पर प्रकाश डालने की दृष्टि का विकास करना।

CO7: विद्यार्थिओं में साहित्यालोचन की दृष्टि को विकसित करना।

M. A. Hindi

प्रश्नपत्र 1 – आदि तथा मध्यकालीन साहित्य का इतिहास

CO1: हिंदी साहित्य के इतिहास तथा आरंभिक काल का परिचय करना।

CO2: हिंदी साहित्य के लेखन स्रोतों एवं परंपराओं पर प्रकाश डालना।

CO3: हिंदी साहित्य आदिकाल, भक्तिकाल और रीतिकाल का परिचय देना।

CO4: साहित्य आस्वादन और अभिरूचि का परिष्कार करना।

CO5: साहित्य और युगबोध के संबंधों का अध्ययन करना।

CO6: साहित्य अध्ययन की ऐतिहासिक दृष्टि का विकास करना।

प्रश्नपत्र 2 – भारतीय साहित्यशास्त्र

CO1: भारतीय साहित्य चिंतन परंपरा का अध्ययन करना।

CO2: साहित्यालोचन क्षमता का परिचय करना।

CO3: साहित्य सृजन के संस्कार करना।

CO4: समीक्षात्मक दृष्टि का विकास करना।

CO5: साहित्य एक प्रकार से शास्त्र है, उसका पढना, चिंतन, आकलन, मूल्यांकन और सृजन करना एक प्रकार की शास्त्रीय तकनीक है। इसी तकनीक का विकास करना इस पाठ्यक्रम का उद्देश्य है।

CO6: साहित्य का स्वरूप, तत्त्व, प्रयोजन, हेतु, शब्दशक्तियां, रस, अलंकार, छंद, विविध विधाओं का स्वरूप, आलोचना आदि अंगों का परिचय विद्यार्थियों को करवाना।

प्रश्नपत्र 3 – भक्तिकालीन काव्य

CO1: भक्तिकालीन कविता की प्रष्ठभूमि का अध्ययन करना।

CO2: सगुण-निर्गुण काव्यधारा की विशेषताओं का अध्ययन करना।

CO3: भारतीय संस्कृति के उत्थान में भक्तिकाव्य के योगदान का अध्ययन करना।

CO4: भक्तिकाल के विविध संतों का सामाजिक, धार्मिक विचारों का मूल्यांकन करना।

प्रश्नपत्र 4 – उपन्यास साहित्य

CO1: हिंदी उपन्यास साहित्य का विकासात्मक अध्ययन करना।

CO2: उपन्यास आस्वाद तथा आलोचनात्मक क्षमता विकास करना।

CO3: हिंदी उपन्यास और युगबोध की परख करना।

CO4: प्रतिनिधिक हिंदी उपन्यासकारों का अध्ययन करना।

प्रश्नपत्र 5 – आधुनिक साहित्य का इतिहास

CO1: हिंदी साहित्य के आधुनिक काल और परंपरा का परिचय करना।

CO2: हिंदी साहित्य के आधुनिक काल की पृष्ठभूमि और प्रवृत्तियों पर प्रकाश डालना।

CO3: हिंदी साहित्य के आधुनिक काल में कविता और गद्य लेखन के विविध प्रकारों का आकलन और मूल्यांकन।

CO4: साहित्य और युगबोध के अंतरसंबंधों का अध्ययन करना।

CO5: हिंदी साहित्य के सामाजिक और आधुनिक पहलुओं पर प्रकाश डालना।

CO6: इतिहासबोध का अध्ययन करना।

CO7: ऐतिहासिक आलोचना का अध्ययन करना

प्रश्नपत्र 6 – पाश्चात्य साहित्यशास्त्र

CO1: पाश्चात्य साहित्य चिंतन परंपरा का अध्ययन करना।

CO2: अद्यतन आलोचनात्मक दृष्टि का अध्ययन करना।

CO3: साहित्यालोचन क्षमता का परिचय करना।

CO4: साहित्य सृजन के संस्कार करना।

CO5: समीक्षात्मक दृष्टि का विकास करना।

CO6: साहित्य एक प्रकार से शास्त्र है, उसका पढना, चिंतन, आकलन, मूल्यांकन और सृजन करना एक प्रकार की शास्त्रीय तकनीक है। इसी तकनीक का विकास करना इस पाठ्यक्रम का उद्देश्य है।

प्रश्नपत्र 7 – रीतिकालीन काव्य

CO1: रीतिकालीन कविता की पृष्ठभूमि का अध्ययन दरबारी संस्कृति के परिप्रेक्ष्य में करना।

CO2: रीतिबद्ध, रीतिसिद्ध औरव रीतिमुक्त कविता का अध्ययन करना।

CO3: रीतिकाल की पृष्ठभूमि और साहित्य लेखन की परंपरा का अध्ययन करना।

प्रश्नपत्र 8 – कहानी साहित्य

CO1: बीसवीं सदी की हिंदी कहानी परिचय करना।

CO2: हिंदी कहानी और प्रमुख कहानी आंदोलनों का परिचय करना।

CO3: हिंदी के प्रमुख कहानिकारों का परिचय करना।

CO4: समकालीन दलित विमर्श, स्त्री विमर्श और आदिवासी विमर्श का मूल्यांकन करना।

CO5: कहानी विधा का तात्विक विवेचन करना।

प्रश्नपत्र 9 – भारतीय साहित्य – 1

CO1: भारतीय साहित्य की अवधारणा का परिचय करना।

CO2: भारतीय भाषा साहित्य के अध्ययन की मदद से भारतीयता की पहचान करना।

CO3: तुलनात्मक अध्ययन की अवधारणा का अध्ययन करना।

CO4: भारतीय साहित्य के प्रतिनिधिक रचनाओं का अध्ययन करना।

प्रश्नपत्र 10 – भाषा विज्ञान

CO1: भाषा का वैज्ञानिक अध्ययन करना।

CO2: भाषा अध्ययन की प्रक्रिया का अध्ययन करना।

CO3: भाषा अध्ययन के ऐतिहासिक परिदृष्य का अध्ययन करना।

CO4: हिंदी भाषा के उद्भव और विकास का परिचय करना।

CO5: भाषा विकास और परिवर्तन का अध्ययन करना।

प्रश्नपत्र 11 – स्वतंत्रतापूर्व हिंदी कविता

CO1: स्वातंत्रतापूर्व हिंदी कविता के विकासक्रम का अध्ययन करना।

CO2: कविता के माध्यम से जनसंवेदना का अध्ययन करना।

CO3: स्वातंत्रतापूर्व काव्य रूपों का अध्ययन करना।

CO4: काव्यस्वादन तथा मूल्यांकन क्षमता का विकास करना।

प्रश्नपत्र 12 – प्रयोजनमूलक हिंदी

CO1: प्रयोजनमूलक भाषा तथा अनुवाद की भूमिका का परिचय करना।

CO2: हिंदी भाषा के प्रयोजनमूलक और व्यावहारिक रूप का परिचय करना।

CO3: भारत देश की राष्ट्रभाषा होने के नाते हिंदी भाषा की एहमीयत का मूल्यांकन करना।

CO4: हिंदी के राष्ट्रीय और आंतर्राष्ट्रीय स्वरूप का मूल्यांकन करना।

CO5: आधुनिक तंत्र विज्ञान में हिंदी की उपयोगिता पर आकलन करना।

CO6: प्रयोजनमूलक भाषा का सैद्धांतिक अध्ययन करना।

CO7: प्रयोजनमूलक भाषा कौशलों का विकास करना।

प्रश्नपत्र 13 – भारतीय साहित्य – 2

CO1: भारतीय साहित्य की अवधारणा का परिचय करना।

CO2: भारतीय भाषा साहित्य के अध्ययन की मदद से भारतीयता की पहचान करना।

CO3: तुलनात्मक अध्ययन की अवधारणा का अध्ययन करना।

CO4: भारतीय साहित्य के प्रतिनिधिक रचनाओं का अध्ययन करना।

CO5: भारतीय साहित्य की अध्ययन की समस्याओं का अध्ययन करना।

प्रश्नपत्र 14 – हिंदी भाषा का इतिहास

CO1: हिंदी भाषा का संरचनात्मक अध्ययन करना।

CO2: हिंदी भाषा के विकासक्रम पर प्रकाश डालना।

CO3: हिंदी की बोलियों का अध्ययन करना।

CO4: देवनागरी लिपि के गुण-दोषों पर प्रकाश डालना।

प्रश्नपत्र 15 – स्वातंत्र्योत्तर हिंदी कविता

CO1: स्वातंत्रोत्तर हिंदी कविता के विकासक्रम का अध्ययन करना।

CO2: स्वातंत्रोत्तर हिंदी कविता के माध्यम से स्वातंत्रोत्तर जनसंवेदना का अध्ययन करना।

CO3: स्वातंत्रोत्तर काव्यरूपों का अध्ययन करना।

CO4: काव्यस्वादन तथा मूल्यांकन क्षमता का विकास करना।

CO5: कविता के कलापक्षीय अंगों पर प्रकाश डालने की दृष्टि का भी विकास करना।

प्रश्नपत्र 16 – माध्यमलेखन

CO1: जनसंचार के माध्यमों का अध्ययन करना।

CO2: माध्यमोपयोगी लेखन का सैद्धांतिक अध्ययन करना।

CO3: माध्यम लेखन कौशलों का विकास करना।

COs: English

B. A. English Paper II & IV: Reading Literature Aim of the Course

CO1: To enable students to read and appreciate various forms of literature and critically interact with them from different perspectives.

CO2: To introduce students to appropriate literary strategies and literature.

CO3: To pinpoint how far literary language deviates from ordinary language.

CO4: To unravel many meanings in a literary text.

Paper IV: Semester Two Unit One: Methodology of Literature

CO1: To develop appreciation for the purposes and pleasures of prose fiction and nonfiction.

CO2: To articulate ways that literary works to construct values and ethical meanings.

CO3: To practice analytical reading on multiple examples of each genre chosen.

CO4: To illuminate literary choices and conventions, including texts that are culturally and historically diverse.

CO5: To identify major features of literary forms and construct arguments.

CO6: To understand different forms of literature - the ode, lyric, Sonnet, novel and dramatic type's comedy and tragedy.

CO6: To understand various aspects of novel and drama.

BA II English Optional

CO1: To enable students to read and appreciate various forms of literature and critically interact with different perspectives.

CO2: To introduce learners with appropriate literary strategies.

CO3: To pinpoint how far literary language deviates from ordinary language.

CO4: To unravel many meanings in a literary text.

Paper V &VII: LITERATURE IN ENGLISH 1550-1750 Paper V: Semester III

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

CO1: Interpret various forms of literature.

CO2: Distinguish and analyze literary forms like essay, mock epic, drama and novel.

CO3: Compare and differentiate between literary language and ordinary language.

CO4: Unravel many meaning in literary text.

Paper VI & VIII: LITERATURE IN ENGLISH 1750-1900 Paper VI: Semester III

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

CO1: Understand literary forms of poetry: Ballad and dramatic monologue, romantic poetry, prose, play and novel in 18th century and 19th century.

CO2: Appreciate the poems of S.T. Coleridge and Robert Browning.

CO3: Comment on themes and styles of Oscar Wilde's play.

CO4: Understand plot, characters and setting in the novel of Thomas Hardy.

BA III English Optional

CO1: To introduce students to Modern English Literature.

CO2: To familiarize students with literary terms and introduce them with various streams in literary criticism and develop skills for literary evaluation.

CO3: To help learners to approach and appreciate Indian literature in English and make them see its place among world literature in English.

CO4: To introduce students to American literature and its diverse cultures reflected in writing.

CO5: To make students able to understand the background of English literature and help them to write on its development.

CO6: To understand how literature of modern period relates to the important trends of the period.

CO7: To make the students aware of the fact that all readers are critics and introduce them to basic texts in criticism while developing critical thinking in them.

CO8: To introduce students to the thematic concerns, genres and trends of both Indian Writing in English and American Literature.

CO9: To lead the students to see how texts are affected by context.

Paper IX & XIII: Twentieth Century English Literature Semester V

Contents: Unit One: Poetry

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

CO1: Understand how the literature of modern period relates to the important trends of 20th century.

CO2: Appreciate poem by T.S. Eliot and W.B Yeats.

CO3: Comment on the themes of Osborne and G.B Shaw's plays.

CO4: Understand character setting in the novels of Kingsley Amiss and D.H Lawrence.

Paper X & XIV: Introduction to Literary Criticism and Terms Semester

On successful completion of the course, students will be able to …..

CO1: Identify and discuss classical Greek critics of literature.

CO2: Provide a brief overview of major critical theories by critics like Aristotle, Sir Philip Sidney, William Wordsworth and F.R. Leavis.

CO3: Learn the terms related to various genres of literature.

CO4: Cultivate an understanding of major critical and interpretive methods.

Paper XI & XV: Indian Writing in English

After studying the course, the learners will be able to…..

CO1: To understand nineteenth Century Reform - Movements in India; the Indian National Movement; Rise of the Indian Novel and Caste-Class.

CO2: To become aware of social, political, and cultural issues reflected in Indian writing in English, with reference to Indian social reformations, freedom struggle, women education and empowerment in nineteenth century.

CO3: To appreciate artistic and innovative use of language employed by writers to instill values and develop human concern through literary texts.

CO4: To familiarize students with emergence and growth of Indian Writing in English in the context of colonial experience.

CO5: To discuss issues concerning Indian Writing in English such as representation of culture, identity, history, constructions of nation, (post) national and gender politics, cross-cultural transformations.

Semester V Poetry:

On successful completion of the course, the students will be able to….

CO1: Understand background of Indian English literature and its development.

CO2: Critically appreciate themes in poems of Nissim Ezekiel and Arun Kolatkar.

CO3: Understand and evaluate themes, plot, character in the plays of Girish Karnad and Vijay Tendulkar.

CO4: Appreciate the theme, setting, characters in the novels of Raja Rao and U.R Anantha Murthy

Paper XII & XVI: Project Work on History of English Literature

CO1: To understand the background of English literature and empower learners on its development.

CO2: To understand different aspects of research methodology.

CO3: To write research papers.

CO4: To understand new trends, movements in English literature.

M. A. English M.A Paper No. I Semester I& II (Literature in English 1550-1798)

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

CO1: Describe culture, thoughts, literary trends and movements through the prescribed texts.

CO2: Critically evaluate poems of John Donne, Dryden

M.A paper No. IV Semester I & II (Study of an Author)

CO1: To understand Elizabethan period and it's glory.

CO2: To examine theme plot and techniques in the plays of Shakespeare.

CO3: To understand sonnets of Shakespeare.

CO4: To analyze William Shakespeare's Art of characterization.

M A II Paper No. V Semester III & IV (Critical Theory)

On successful completion of the course, the students will be able to…..

CO1: Critically understand the theories of F.D. Saussure and Derrida.

CO2: Examine theory of feminism and psycho analysis and nativism.

CO3: Explain theory of post modernism Aziz Ahmad.

CO4: Sharpen the intellectual sensibility.

M A II Paper No. VI Semester III & IV (Indian writing in English)

On successful completion of the course, students will be able to…..

CO1: Understand Indian English literature - origin development and its growth.

CO2: Comprehend themes in Indian English poetry, short stories and novels.

CO3: Enhance literary and linguistic competence.

CO4: Create literary sensibility and aesthetic response.

M A II Paper No. VII Semester III & IV (English language teaching)

On successful completion of the course, the students will be able to…..

CO1: Understand learner's community with learning process, nature and structure of language.

CO2: Understand teaching of English language in terms of new and more effective methodologies of classroom management material selection and evaluation.

CO3: Use of ICT in teaching of English.

CO4: Understand English Language and English Grammar.

M.A II Paper No. VIII - Semester III & IV (American literature)

CO1: To comprehend poems of Walt Whitman Langston Hughes, Emily Dickinson, Joy Harjo, and Sylvia Plath, prose by Emerson, Henry James plays by Arthur Miller and T Williams And fiction by Toni Morrison and Saul Bellow

CO2: To critically appreciate literary texts.

CO3: To distinguish and analyze literary forms in the context of major developments in American literature.

CO4: To explain and account for rise of American literature in literary history.

COs: Sanskrit

BA - SANSKRIT Paper I - Sanskrit Sarita

CO1: To introduce learners to Sanskrit language, literature & Indian culture.

CO2: To study usage of Sanskrit language in modern period.

CO3: To understand importance of language in communication skills & personality development.

CO4: To create interest in Sanskrit language for the study of scientific views in Sanskrit literature.

BAFY SANSKRIT - Optional Paper - I Aarshamahakavya

CO1: To introduce students the ancient Sanskrit poetics.

CO2: To introduce students to epics Ramayana & Mahabharata.

CO3: To develop literary values & ethics.

CO4: To study the importance of epics in Sanskrit Literature.

Paper- II Vyakaranparampara

CO1: To understand the structure and development of Sanskrit grammar.

CO2: To study the origin & development in Sanskrit grammar.

CO3: To know the impact of Sanskrit grammar on Sanskrit language.

CO4: To study the Trimuni grammar tradition in Sanskrit grammar.

Paper - III Pratimanatak

CO1: To study Bhasa's literature according to social, political, cultural & moral values.

CO2: To introduce ancient & developed Sanskrit drama traditions.

Paper- IV Kathasahitya

CO1: To introduce tradition of Sanskrit stories.

CO2: To study literary merits of Sanskrit stories such as - imagination, description, symbolism etc.

CO3: To study ancient teachings and behavioral trainings.

BASY SANSKRIT - Second Language (SL) Paper - II Girvanmanjari

CO1: To introduce students to various forms of Vaidic Literature.

CO2: To introduce different aspects of Sanskrit language & develop accuracy in Sanskrit phonetics.

CO3: To study different styles of meters in Sanskrit poetics for recitation of poems.

BASY SANSKRIT - Optional Paper - V Pancha Mahakavyacha Etihas

CO1: To study the tradition of skillful Panch Mahakavyas in Sanskrit literature

CO2: To understand the characteristics of skillful Panch Mahakavyas.

CO3: To study themes, character sketches, styles, rasa, alanakaras and meters of Panch Mahakavyas and learn the impact of various aspects of literature on it.

Paper- VI Raghuvansham

CO1: To understand introductory nature of kalidasas Raghuvansham.

CO2: To understand the style of Raghuvansham.

CO3: To study the literary values of Raghuvansham.

CO4: To study the idols in Raghuvansham.

Paper - VII Shukanasopadesh

CO1: To study nature of prose tradition in Sanskrit literature.

CO2: To study nature and characteristics of prose Kadambari.

CO3: To enhance awareness of the importance of teacher's teachings for the youths.

CO4: To discuss the effects of power, asset and youthfulness in reference to Shukanasopadesh.

Paper- VIII Sangeet Saubhadra

CO1: To study drama Sangeet Ssaubhadra as a symbol of modern Sanskrit literature.

CO2: To understand translated Sanskrit literature.

BATY SANSKRIT - Optional Paper - IX Vaidic Sukte

CO1: To introduce the ancient Vedic Language and Vaidic Literature.

CO2: To study the Vedic Literature and culture in the point of view of science.

CO3: To learn the oral tradition of education through different Vedic Suktas.

Paper- X Natyalakshan & Natak

CO1: To study the properties of Natya in reference to Natyashastra.

CO2: To develop interest in the studies of socio-cultural aspects and idols of Abhijnansakuntalam.

CO3: To prepare students to go for detail study and understanding kalidasa's writing skills in dialogues, aesthetics and characters.

Paper - XI Vyakaran

CO1: To study the topic *Sandhi*.

CO2: To familiarize the students with different types of *Sandhi* to understand the language better.

Paper- XII Tattwajnan

CO1: To introduce students with the spiritual life of Indian culture.

CO2: To understand the philosophy in Bhagawadgita.

Paper - XIII Natak (Abhijnanshakuntalam)

CO1: To introduce students with literary merit, beauty and creativity of Kalidas.

CO2: To study Abhijnansakuntalam as a pre-eminent creation in Sanskrit literature.

Paper - IVX Sahityashastra

CO1: To understand the nature of poem and poetics.

CO2: To familiarize the learners with different types of rhetoric.

CO3: To aware students for enjoying perception of pleasure of literary sources with the help of rhetoric.

Paper - XV Project

CO1: To develop students to establish research values and findings.

CO2: To build confidence about creative writings among the learners.

CO3: To introduce advanced units of language so that they become aware of practical usage.

COs: Sociology

B. A. Sociology B.A. Part-I, Semester I Paper no-I: - Introduction to sociology & Paper No-II:-Individual & Society

On the studying the course, the leaners will be able to .....

CO1: Familiarize with basic concepts of sociology.

CO2: Understand significance of sociology.

CO3: Understand the scope and importance of sociology, its origin and development.

CO2: Understand human Society and institutions and other structural elements.

B.A. part-I, Semester II, Paper no III - Introduction to Subfields of Sociology& Paper No IV – Indian Social Composition

CO1: Students acquire knowledge to understand the scope of sociology & its wideness.

CO2: To understand broad segments of Indian society.

CO3: To understand India's geographical ethnic and religious distinctiveness.

B.A. Part-II, Semester III Paper No-V: -Problems of Rural India Paper no-VI: - Contemporary Urban Issues

CO1: Learners will be made aware of changing scenario of Rural India and the contemporary problems of rural development.

CO2: Learners are inculcated with analytical and thinking about urbanization urban planning and urban problems.

B.A. part-II, Semester IV Paper no- VII: Population in India Paper No-VIII: - Sociology of Development

CO1: To understand causes, consequences of Indian population change.

CO2: To provide an overview of development Issues in India.

B.A. part-III Semester V paper: - Paper IX: Sociological Tradition Paper No. X: Introduction to Research Methodology Paper No. XII (Main) Urban Sociology

CO1: To provide the students with basic understanding of emergence of sociological thoughts.

CO2: To develop sociologists with their contributions to sociology.

CO2: To introduce Research Methodology for better understanding of application of social sciences.

CO3: To enable learners with urban sociology.

CO4: To comprehend the basic elements of subject.

CO5: To focus attention towards increasing urbanization.

B. A. part - III Semester VI Paper NoXIII. : Sociological Theories Paper No. XIV: Social Research Methods Paper No.XVI: Urban Society in India

CO1: Acquaintance with the sociological thought of the Pioneers of Sociology

CO2: To introduce students with various steps in conducting research.

CO3: To analyze critically social problems of urban India.

CO4: To discuss impact of modernization and industrialization upon the cities.

M. A. Sociology M.A. part-I, Semester I Paper no-401: Theoretical Perspective in Sociology-1 Paper No-402-Methodology of Sociological Research Paper No- 421; Rural Society in India-1 Paper No 430; Contemporary Social Problems in India-1

After studying the course, leaners will be able to …..

CO1: Understand theoretical concepts of sociology.

CO2: Familiarize with fundamentals of methodology of social research.

CO3: Aware of changing scenario of Rural India.

CO4: Understand contemporary problems of rural development.

CO4: familiarize students with the concepts of social problems and theoretical approaches to understand them.

M.A., Semester II, Paper no 403- Theoretical Perspective in Sociology 2 Paper No 404 – Methodology of Sociological Research and statistics Paper No 431- Rural Society in India 2 Paper No 440; Contemporary Social Problems in India-2

CO1: To introduce students with interactionist theory.

CO2: To develop a critical outlook at the exiting perspective and methods.

CO3: To evolve conceptual clarity future research.

CO4: To understand basic characteristics of peasant society in India.

CO4: To study various strategies, programmes and measures adopted in the modern society to solve these problem.

M.A. Part-II, Semester III Paper No-501: -Classical Sociological Tradition: Marx and Durkhim Paper no-502: - Sociology of Development Paper No-521: Social Demography:

1 Paper No- 526: Criminology -1

CO1: To understand the sociological theories of Karl Marx and Emile Durkhim.

CO2: To provide an overview of the historical development process.

CO3: To introduce students with population growth in India and the world.

CO4: To introduce the students with criminology.

M.A. part-II, Semester IV Paper no-503 -: Classical Sociological Tradition: Weber, Pareto, Cooley and Mead Paper No: -504 Development – An Indian Experience Paper No: -531: Social Demography 2 Paper No- 536: Criminology -2

CO1: To develop an insight for understanding developments in sociological theory.

CO2: To understand contemporary socio - economic framework of development in India.

CO3: To understand basic demographic concepts to develop their sociological knowledge.

CO4: To introduce students to criminology.

COs: Economics

B.A. Economics Micro Economics:

CO1: To provide foundations of economics.

CO2: To understand scope of micro-economics, the behavior of an economic agents - namely, a consumer, a producer, a factor owner and the price fluctuation in a market.

CO3: To study behavior of a unit and analysis.

Price Theory:

CO1: To understand different components regarding price determination under various types of markets.

CO2: To understand theory of production, cost and revenue analysis, forms of market and factor pricing theories.

Indian Economy:

CO1: To study analytical factor of the students, by highlighting an integrated approach to be functioning aspects of the Indian economy, keeping in view the scope for alternative approaches.

CO2: To study social, political and economic environment influencing policy decisions.

CO3: To develop specific modules.

Macro Economics:

CO: To create awareness of basic theoretical frameworks underlying the field of macroeconomics.

Development Economics:

CO: To understand theories and developments underlying the field of development economics.

International Economics:

CO1: To understand the basic principles that trend to govern the free flow of trade in goods and services at global level.

CO2: To understand and analyze the difference between various economies of the world.

Agricultural Economics:

CO1: To study the treatment of issues in agriculture economics to those intending to specialize in the area.

CO2: To familiarize students with policy issues those are relevant to Indian agricultural economics.

CO3: To analyze the issues using basic micro economics.

History of Economic Thought:

CO1: To understand the basic ideas of classical, new classical and marginality economist.

CO2: To compare the basic economic ideas of various economic thinkers of the world.

Money Banking and Finance:

CO1: To understand role of money and banking as the components of modern economy.

CO2: To understand the operations of money and banking.

CO3: To study interaction of money and banking with the rest of the economy.

CO4: To understand monetary and banking systems in India.

Public Finance:

CO1: To study the significance and scope of Public Finance.

CO2: To provide detailed information about the fiscal policy, public revenue, public debt and public expenditure.

Statistical Methods:

CO1: To understand techniques of statistical analysis which are commonly applied to economic problems.

CO2: To study the tools and techniques of statistical methods.

CO3: To understand data collection, its presentation, analysis and making inferences.

Research Methodology:

CO1: To understand the concept of social science research.

CO2: To know the importance of social research, design of research problem, data collection and presentation of data.

CO3: To understand the idea of research in social sciences.

Industrial Economics:

CO1: To understand basics of industrial economics.

CO2: To study globalization and liberalization in contemporary world.

Economy of Maharashtra:

CO1: To understand the basic features of economy of Maharashtra.

CO2: To study the problems related with agriculture, industries, cooperative sector and infrastructure in the Maharashtra state.

COs: Public Administration

B. A. Public Administration principles and concepts of public Administration

After completion of the course, learners will be able to ……

CO1: Get familiarize with the history of public administration.

CO2: Understand the principles of public administration.

CO3: Acquire substantial knowledge of organizational and management theory.

CO4: Understand theories of postmodernist.

CO5: Understand managing public organizations.

Public Administration in India

CO1: To identify the Constitutional framework of administrative law.

CO2: To understand the role of specific constitutional principles of structural, substantive, and procedural due process constrain.

CO3: To understand quasi-legislative and quasi-judicial administrative action.

CO3: Students will understand the process of administrative rule-making as a part of the legal process.

Maharashtra Administration

Learners will be able to understand…..

CO1: Basic features of Maharashtra Administration.

CO2: Constitutional framework of administrative law and administrative adjudication.

CO3: The process of administrative rule-making as a part of the legal processes.

CO4: Problems related agriculture, industries, cooperative sector and infrastructure in Maharashtra state.

- **District Administration**

CO: Undergraduates are made of aware local level District Administration framework and Factions.

Personnel Administration

CO1: To familiarize students with merit system in public administration, including the Indian Civil Service System and those used in local governments.

CO2: To describe performance evaluation systems used in public personnel administration.

CO3: To understand forced-choice, ranking, and interpretive etc. systems.

CO3: Learners will be able to describe various models of administering evaluation systems.

CO4: To develop a position description which includes observable performance measures and required qualifications?

Panchayati raj and Rural Development

After studying the course, learners ….

CO1: Get familiarize with the common forms of rural governments including the various municipal forms, county governments and regional administration of state and federal offices.

CO2: Students are able to gain an appreciation for the diverse people, landscapes, and cultural traditions constituting rural India.

CO3: Develop a deep understanding of issues currently confronting in rural India - economic shifts, demographic changes, educational challenges, and cultural changes.

CO4: Can evaluate economic, social, environmental, and governmental impacts of changes in the structure of agriculture on rural areas.

CO5: Understand ethical challenges of rural communities.

Financial Administration

CO1: To familiarize leaners with general public budgeting process at the national, state and local levels.

CO2: To understand constitutional and legal requirements as well as the established procedures.

CO3: The students become able to describe the strengths and weaknesses of each of the strategies as well as the historical outcomes.

CO4: To know the budget presentation for developing the figures, the justification for the amounts, and the reasons for selecting the particular strategy applied.

CO5: To demonstrate ability to develop a budget with a team at a basic level.

Human Resource Development

After studying the course, the students become able …..

CO1: To understand the evolution and functions of HRD.

CO2: To identify the content, process and outcomes of HRD applications.

CO3: To evaluate and understand diversity issues and their impact on organizations.

CO4: To analyze the key issues related to administering the human elements such as motivation, compensation, appraisal, career planning, diversity, ethics, and training.

CO5: To explain fundamental concepts, principles, techniques and judgment in supply-demand forecasting and supply programs in determining HR planning.

Administrative Thinker

CO1: Students can understand basic ideas of classical, new classical and marginality Management & administrative through this course.

CO2: Students can compare basic management & administrative ideas of various management & administrative thinkers of the world.

Public Policy and Development

CO1: Student will be able to demonstrate the contribution of policy analysis.

CO2: To understand influence of policy analysis as well as the impact of analyst on the field in legal, political, and organization practice.

CO3: To identify the manner in which the intent of a given policy is determined.

CO4: Students get familiarize with mechanisms operating in the major political institutions and agencies for the creation and implementation of public policies.

CO4: Student can identify the problem being addressed in a given policy.

CO5: Leaners are made familiar with predominant political, economic, and social actors that actively engage in the policymaking process, including expert communities, interest groups, the media, agency bureaucrats, and elected officials.

Health Administration in India

CO1: It makes the undergraduate students aware of health and health related problems.

CO2: Student can identify the content, process and the outcomes of rural health mission.

CO3: Student will be able to understand major issues of health in India.

Recent Trends in public Administration and Important Laws

After studying the course, learners can….

CO1: Critically engage in various disciplinary perspectives and theoretical approaches to the study of public administration and governance.

CO2: Understand the core theories, concepts and approaches used in different subfields of public administration.

CO3: Critically assess administrative systems and modes of governance in specific policy contexts.

COs: Political Science

B. A. Political Science Pol-101, Basic Concept of Political Science

CO1: To understand the basics of political science.

CO2: To study the development of rights- state background of political history.

CO3: To analyze transitions in societal systems - the structure and order of the system.

Pol-102, Government and Politics of Maharashtra

CO1: To establish pattern of Maharashtra State.

CO2: To examine the government and non-government responses.

CO3: To understand history of the Freedom Movement in India collected from the Bombay Government Records.

CO4: To understand historical and political background of Maharashtra.

CO5: To explain structure and functions of state government in India.

CO6: To understand the political process of Maharashtra.

Pol-103, Basic Concept of Political Science

CO1: To define terms in a social science outside their immediate area of expertise.

CO2: To create awareness among students about democracy.

CO3: To help students to understand social and political values in Indian political system.

CO4: To understand the concept of welfare state.

Pol-104, Government and Politics of Maharashtra

CO1: To study elections and election process.

CO2: To provide solution to social problems.

CO3: To study Panchayat raj History.

CO4: To orient the students about ideology and programme of political parties in Maharashtra.

Pol-105, Indian Government and Politics

CO1: To study the prosperity of society.

CO2: To understand political events in government of India.

CO3: To understand basic principles of Indian constitution.

CO4: To study the Indian constitution.

Pol-106 International Relations

CO1: To understand the behavior of individual entrepreneurs and firms rather than world politics, liberalism.

CO2: To understand important implications for international law and international relations.

CO3: To explain basic concepts in international relations.

CO4: To understand the stages of development of international relation as a separate discipline.

Semester - IV Pol-107, Indian Government and Politics

CO1: To explain structure of union government and budgetary process in India.

CO2: To understand the framework of Indian supreme court.

CO3: To explain party system and electoral reforms.

CO4: To evaluate the federal structure and center state relation.

Pol-108, International Relations

CO1: To explore the nature of informal reasoning in international relations and to consider how instruction could help enhance.

CO2: To study various international and regional organization.

CO3: To aware the students about major issues in internationalism.

CO4: To evaluate critically the non-alignment movement.

Semester V Pol - 109, Indian Political Thinkers

CO1: To understand modern political thinker's contribution.

CO2: To learn the problems in cultural transformation of Indians into non-Indians.

CO3: To study the religious, political, social and cultural thoughts of Indian political thinkers.

Pol - 110, Western Political Thinkers 33

CO1: To understand the views of western political thinkers.

CO2: To understand the ideas of western political thinkers and its relevance.

CO3: To understand the thoughts of Plato on various political concepts.

CO4: To know ideas of Aristotle and his role in western politics.

Pol - 112, Indian Political Thinkers

CO1: To study Dr. B. R. Ambedkar's thoughts on democracy, economy and society.

CO2: To evaluate critically M. N. Roy's radical humanism.

CO3: To understand Nehru's democratic and secular views and its applicability.

CO4: To know of ideas of Maulana Azad views on religion and politics.

Pol - 113, Western Political Thinkers

CO1: To present thoroughly the wealth of historical and institutional materials.

CO2: To study the thoughts of J. S. Mill and its applicability.

CO3: To evaluate critically the thoughts of Karl Marx and its relevance.

CO4: To understand the theory of utilitarianism.

Pol – 111, Political Ideologies

CO1: To study the development and features of political ideologies.

CO2: To understand relevance of political ideology in contemporary period.

CO3: To study the origin of ideologies and clash of three political ideologies - liberalism, communism, and fascism.

CO4: To correlate the theoretical discussion and analysis of ideologies to the transformations.

Pol - 114, Political Ideologies

CO1: To study of ideology of socialism.

CO2: To evaluate critically the ideology of fascism.

CO3: To study the development and features of communism.

CO4: To explain the ideology of feminism.

M. A. Political Science PSC-401, Western Political Theory

CO1: To introduce Western political theory.

CO2: To understand meaning and nature of political theory, debates as well as recent theoretical trends.

CO3: To explain philosophy, political theory and political ideology and uses of political theory.

PSC- 402, Theories of International Relations

CO1: To understand changing nature of international relations in terms of traditional approaches as well as major scientific approaches.

CO2: To explain the theories of international relations.

CO3: To understand the basic concepts of international relations.

PSC- 403, Comparative Politics: Theoretical Perspective

CO1: To deal with the research process that ought to proceed.

CO2: To study the comparative methods in politics.

CO3: To know the emergence of new source of politics, comparative politics and comparative governments.

PSC- 432, State Politics in India

CO1: To introduce to the dynamics of state politics in India.

CO2: To focus on the study of evolutionary nature of center-state relationship in the country after independence.

CO3: To enable students to know elections and political parties, changing nature of political process.

PSC- 404, Modern Political Ideologies

CO1: To develop the foundations of political system.

CO2: To understand political ideologies, liberalism, conservatism, socialism, Marxism etc.

CO3: To orient students about political ideology and development.

PSC- 405, World Politics: Issues and Debates

CO1: To introduce students to critical analysis and new trends in the field of world politics.

CO2: To create awareness about important issues in contemporary world politics.

CO3: To explain the cold war and its impact on world politics.

PSC- 406, Western Political Thought

CO1: To impart political thoughts to occupy central position in the knowledge mechanism of political science.

CO2: To understand the theory debate and enable leaners to make an inquiry into the socio-political problems.

CO3: To understand the views of western political thinkers on different political concepts.

PSC- 435: Public Administration

CO1: To acquaint students with the concept of public administration.

CO2: To understand theories, management, organization and imbibe its significance as a growing discipline in life.

CO3: To understand the basic concepts of public administration approaches and new public administration.

PSC- 407, Research Methods in Social Sciences

CO1: To acquaint the leaners with the basic concepts of research.

CO2: To understand the latest & scientific techniques and modern trends in social research.

CO3: To understand major study in the research process.

CO4: To understand the basics of research methods in social sciences.

PSC- 408, Indian Political Thought

CO1: To understand the precise aim of colonial movement in India.

CO2: To interpret the Indian political thoughts.

CO3: To evaluate the British impact on Indian society.

CO4: To understand and evaluate theoretical perspective of social reform movements in 19th century social vs political reforms.

PSC- 409, India's Foreign Policy

CO1: To understand basic approaches in the study of foreign policy.

CO2: To explain elements in the making of foreign policy.

CO3: To know the basic approaches to the study of foreign policy.

CO4: To focus and evaluate the changing nature of India's foreign policy.

PSC- 437, Modern Trends in Political Theory

CO1: To provide an overview of current trends in political theory.

CO2: To provide insights into divergent trends in modern political theory.

CO3: To study the social justice, theory of rights and feminist political theory.

PSC- 410, Constitutional process in India

CO1: To understand the constitution - various provisions, rights and duties.

CO2: To take an overview of dignity of citizen, with emphasis on secular values, liberty, equality, justice and brotherhood.

CO3: To know the framing of Indian constitution background.

CO4: To understand the working of Indian constitution and assembly.

PSC- 411, Political analysis

CO1: To deal with the key issues related with political theory.

CO2: To familiarize the learners with ever on-going debate on the concepts like liberty, equality and a social justice from Liberal and Marxist perspectives.

CO3: To focus on modern analytical trends.

CO4: To study the political theory.

PSC- 412, South Asia and the world

CO1: To understand the challenges of a global job market.

CO2: To focus on micro study of South Asian region.

CO3: To specialize the students on South Asian study.

PSC- 423, Dr. Babasaheb Ambedkar on Caste: A study of his text annihilation of caste

CO1: To understand the work of Dr. Babasaheb Ambedkar in annihilation of caste.

CO2: To know the impact of caste system on the development of Indian democracy.

CO3: To introduce learners to the problem of caste system.

CO4: To understand Dr. Ambedkar's theories, vision of ideal society, social vs political reforms.

COs: History

B. A. History Shivaji and His Times (1630-1818)

CO1: To introduce leaners about the innovative study techniques in the of History of Marathas.

CO2: To provide value based conceptual and thought provocative.

CO3: To provide insights into the Mughal rulers and the Maratha Empire.

CO4: To introduce international elements in the study of Marathas to facilitate comparative analysis of the history.

CO5: To highlight the importance of past in exploration of present context.

CO6: To understand the socio-economic, cultural and political background of 17th century of Maharashtra.

CO7: To provide spirit of healthy Nationalism & Secularism among the learners.

History of Modern Maharashtra (1818-1960)

CO1: To familiarize students to the study of Maharashtra.

CO2: To acquaint learners with the basic understanding of developmental stage of Maharashtra.

CO3: To impart high quality education to the students with reference to Maharashtra.

CO4: To prepare the students for a variety of challenging careers through innovation in teaching and research.

CO5: To develop comprehensive understanding of interdisciplinary issues of the society.

History of Early India (up to B.C. 300)

CO1: To understand the ancient Indian history.

CO2: To understand the nature of races and tribes intermingled in early India.

CO3: To evaluate Hinduism, Jainism, and Buddhism in ancient times.

CO4: To understand the nature of past and obstacles that impedes India's progress as a nation.

History General Paper-VIII History of Mughal India (A.D. 1526- A.D. 1757)

CO1: To understand the Mughal contribution to the Indian history.

CO2: To know the Mughal period.

CO3: To study Persian art and culture amalgamated with native Indian art and culture.

CO4: To study the political unity provided by the Mughal rulers.

History General Paper – IX Historiography

CO1: To understand and evaluate the development of history as a discipline.

CO2: To understand writing of historical accounts.

CO3: To highlight the significance of thinking "historiographically".

CO4: To provide new angles to research and interpretations.

History General Paper-X History of Indian national Movement (A.D. 1885- A.D. 1947)

CO1: To provide a comprehensive understanding of the transformations in the economy of colonial India.

CO2: To introduce land and agrarian policies under the British rule.

CO3: To develop nationalism in learner's mind.

CO4: To understand the British economic policy and Indian revolts.

CO5: To understand the British parliamentary acts that led to the foundation for the Indian constitution.

M. A. History Course Code- HIS-401: History of India up to 300 B.C.

CO1: To understand the stage wise development of civilization, morals, ethics and culture.

CO2: to know the progression of cultural history in India.

CO2: To provide a broad overview of proto-historic developments in India.

CO3: To understand historic cultural heritage of our country through archaeological context.

CO4: To provide details of the Harappan urbanism and other Chalcolithic cultural developments in India followed by the Megaliths and their cultural background in peninsular India.

CO5: To learn developments of architecture and iconography in the early historic period.

CO6: To introduce students to archaeology and the methods used by archaeologists.

M.A. History- I year Course Code- HIS-402 Course Title- Twentieth century world (up to end of World War II)

CO1: To understand and critically analyze the nature and political discourses of the twentieth century world war.

CO2: To understand the trends in history during the first and second world war.

CO3: To study the historical perspectives of the developed, developing and underdeveloped nations.

M.A. History- I year Course Code- HIS-421 Course Title- Socio- Religious Movements in Maharashtra (1200-1700 A.D.)

CO1: To study approaches of Bhakti movements by modern thinkers.

CO2: To understand the ideology and protests of religious sections towards social structure of medieval Indian society.

CO3: To provide insights into religious ideas, forms, nature of language and literature during ancient time.

CO4: To understand the rise of religious movements.

M.A. History Course Code- HIS-423 Course Title- History of the Marathas 1600 to 1707

CO1: To understand political history of Chhatrapati Shivaji.

CO2: To orient learners to acquire proper understanding of Shivaji's administration and importance of his politics regarding agriculture, trade and religion.

M.A. History Course Code- HIS-424 Course Title- Nineteenth century India

CO1: To understand the nature of politics, society, culture in India prior and after the entry of British.

CO2: To study the policies of British East India Company.

CO3: To evaluate the impact of British East India Company on Indian society.

CO4: To evaluate political cultural circumstances during the nineteenth century in India.

Course Code- HIS-403 Course Title- State, Society and Culture of India (300 B.C. - 500 A.D.)

CO1: To inculcate skills among students regarding politics, economy and society.

CO1: To understand the past of 300 B.C. - 500 A.D.

Course Code- HIS-404 Course Title- Polity in Medieval India

CO1: To understand polity in Medieval Indian history.

CO2: To understand sources and historiography of medieval Indian history.

CO3: To evaluate the approaches of medieval Indian History by modern historians.

CO4: To understand the perspectives in Medieval administrations.

CO5: To evaluate the administration in Medieval Indian history.

Course Code- HIS-429 - Polity in Medieval India

CO1: To understand the development of political and social ideas in history of India from ancient times to the colonial era.

CO2: To study the development of ideas that enables students to undertake the critically evaluation of political and social ideas through historical process.

Course Code- HIS-430 Course Title- History of the Marathas (1707-1818)

CO1: To understand the 18^{th} century political development of India and particular of Deccan.

CO2: To study the social and economic institutions expanded in Maharashtra.

CO3: To provide brief information about the political economy and architecture of the Marathas.

COs: Psychology

Psychology B.A. I year

PSY 101 General Psychology

CO1: To provide solid foundation for the basic principles of psychology.

CO2: To familiarize students with the historical trends in psychology, major concepts, theoretical perspectives, empirical findings.

CO3: To provide an overview of the applications of psychology.

PSY 102 Social Psychology

CO1: To appreciate how individual behavior is influenced by social and cultural contexts.

CO2: To enable student to develop an understanding of functioning of dyads, groups and organization.

CO3: To understand the unique features of Indian socio-cultural context.

CO4: To analyze social problems in terms of various social psychological theories.

PSY 104 Basic Concepts in Psychology

CO1: To understand basic concepts in psychology.

CO2: To familiarize learners with the historical trends in psychology, major concepts, theoretical perspectives and empirical findings.

CO3: To provide an overview of the applications of psychology.

PSY 105 Basic Concepts in Social Psychology

CO1: To understand the influence of social factors on individual's behavior.

CO2: To analyze impact of social problems on psychological theories.

B.A. II year PSY 110 Psychology for Living:

CO1: To understand the connection between psychology and its practical application to everyday life.

CO2: To apply psychological principles to face challenges in life.

CO3: To enable learners to solve issues encountered in life - stress, health, personal relationships communication and self-esteem.

PSY 111 Psychological Statistics:

CO1: To understand psychological assessment techniques.

CO2: To familiarize learners with statistical methods, their applications and interpretations.

CO3: To inculcate skills for selecting and applying different tests for evaluation, training, rehabilitation etc.

CO4: To enhance observation skills.

PSY 107 Psychology of Adjustment:

CO1: To understand psychology and its practical applications in daily life.

CO2: To enable learners for psychological principles and their applications.

CO3: To enables learners to analyze and face issues encountered in everyday life.

PSY 108 Psychological Testing:

CO1: To understand psychological assessment techniques.

CO2: To understand uses and interpretations of psychological tests.

CO3: To impart and enhance skills for selecting and applying different tests.

B.A. III year PSY 113 Subsidiary Abnormal Psychology

After studying the course, leaners will be able to understand….

CO1: Critical Thinking

CO2: Effective Communication

CO3: Community and Civic Responsibility

CO4: Quantitative Literacy

CO5: Scientific and Technological Effectiveness

COs: MA Psychology

PSY-401 Cognitive Psychology

After studying the course, leaners will be able to understand….

CO1: Cognitive psychology – emergence, research methods, goals of research, computer simulations and artificial intelligence.

CO2: Attention and is types.

CO3: Approaches to study of perception and its applications.

CO4: Memory processes - encoding, storage and retrieval.

CO5: Forgetting - interfaced, decay and retrieval

PSY-402 foundation of behavioral research and statistics

Leaners will be able to understand …..

CO1: Basic concepts - problems, hypothesis, and variables

CO2: Meaning and types of variables.

CO3: Concepts and meaning of correlation.

CO4: Significance of the mean.

CO5: Concepts in sampling and its types.

CO6: Techniques of observations and data collections.

PSY-403: Psychology of personality

CO1: To understand theories of personality evaluation.

CO2: To understand psychoanalysis approaches.

CO3: To understand intrapsychic theories.

CO4: To understand ego analytic psychology.

CO5: To understand behavioral and learning theories.

PSY-404: Cognitive process

CO1: Introduction to memory.

CO2: Understanding of problem solving ability and creativity.

CO3: Reasoning and decision making.

CO4: Language production- reading, speaking and writing.

CO5: Understanding of the cognitive development.

PSY-405: Research design and statistics

CO1: To understand the basic concepts of experimental designs

CO2: To understand the analysis of variance (ANNOVA)

CO3: To understand and apply social scientific research

CO4: To understand methods of analysis- chi square and non-parametric tests

PSY-406: Personality theories

Learners will be able to understand…..

CO1: Dispositional theories.

CO2: Factor analytic theories.

CO3: Humanistic and experiential theories.

CO4: Essential and cognitive theories.

CO5: Cognitive behavioral theories.

PSY-407: Counseling process:

Students will be able to understand and apply….

CO1: Trends in counseling.

CO2: Building counseling relationships.

CO3: Working in counseling relationship.

CO4: Termination of counseling relationship

PSY-408: Psychopathology – I

CO1: To understand abnormal behavior.

CO2: To understand and apply stress and adjustment disorder.

CO3: To understand disorder of childhood and adolescence.

PSY-409: clinical assessment

Students will be able made familiarize to…..

CO1: General issues of psychological assessment

CO2: Clinical interviewing

CO3: Personality assessment and behavioral assessment

PSY-410: Counseling specialties

After studying the course, learners can understand ….

CO1: Career counseling over the life span

CO2: Marriage, couple and family counseling

CO3: Processional school counseling

CO4: Career counselling and student life service

PSY-411: Psychopathology – II

CO1: Panic, anxiety and their disorder

CO2: Somatoform and dissociative disorder

CO3: Personality disorder

PSY-412: Clinical intervention

CO1: Clinical interventions

CO2: Psychodynamic psychotherapy

CO3: Humanistic experiential and family therapies

CO4: Cognitive behavioral intervention

COs: Drama

B.A. DRAMA B.A. First Year First Semester Paper- I

CO1: To understand expressing ideas through Drama.

CO2: To understand apply different arts of culture.

CO3: Deep understanding of poetry, stories, novels in literature.

CO4: To understand history of theatre.

CO5: Introduction to Sanskrit theatre and it importance.

B.A.FIRST YEAR SEMESTER-II PAPER-III

CO1: To know the development of old theatre tradition around the world.

CO2: To create awareness and understand developments in the history of theater.

CO3: To understand structural analysis of play.

CO4: To writing story play.

CO5: To understand regional theater, understanding play and structure.

CO6: To apply acting techniques.

B.A.SECOND YEAR SEMESTER-III PAPER-III (THEORY)

CO1: Deep understanding of Sanskrit theatre and drama.

CO2: Understanding of developments in architecture and stage.

CO3: Understanding of religious cultures in India.

CO4: Understanding various types of drama.

CO5: Introduction to Indian folk culture.

CO6: Studying folk art in Maharashtra.

CO7: Studying folk art and folk culture in the western country.

B.A.SECOND YEAR SEMESTER-III PAPER-IV (PRACTICAL)

CO1: To study different arts of color.

CO2: To introduce elements of lighting in the play.

CO3: To study enhancement of secrecy, concentration, and body language.

CO4: To understand personality development.

CO5: To develop cowardice and storytelling skills.

CO6: To enhance communication skills.

B.A.SECOND YEAR SEMESTER-IV PAPER-IV (PRACTICAL)

CO1: Personality development, command on self-voice, communication skill of language.

CO2: Details study of lighting, color effects.

CO3: Study make up, knowledge of colors and personality development.

CO4: Creation of learner's interest in reading, singing.

CO5: Improvement in body language and thinking power of learner.

B.A.THIRD YEAR SEMESTER-VI (SPECIAL) THEORY

CO1: Deep knowledge of European theatre, various types of drama school and their technique.

CO2: Understanding of play production technique and production planning.

CO3: Introduction to the development of various folk forms.

CO4: Understanding of folk plays.

CO5: Introduction and understanding of various actors and their techniques.

B.A. SECOND YEAR SEMESTER-VI PAPER-III (THEORY)

CO1: Understanding the features of personality development.

CO2: Enhancing observation ability of the learner.

CO3: Understanding of costumes and the sense of development.

CO4: Applying knowledge of makeup, lighting, music in Drama.

CO5: To inculcate the skills of director in the leaners.

B.A.THIRD YEAR SEMESTER-V PAPER-IX COMMON PAPER (THEORY)

CO1: To understand play production procedure, rehearsal technique development and theatre management development.

CO2: To understand different acting developments.

CO3: To set designing of knowledge development and perfection in set designing.

CO4: To develop costume designing knowledge in costume designing.

B.A.THIRD YEAR SEMESTER-VI PAPER-XI COMMON PAPER (THEORY)

CO1: Understanding of modern Marathi theatre.

CO2: Understanding of types of theatres and their development.

CO3: To apply skills of a stage manager.

CO4: Understanding knowledge development in play.

CO5: Introduction to gramin and dalit literature.

CO6: Introduction to street play.

B.Voc Theatre & Stage Craft Semester I History of Theatre (TH):

CO1: Introduction to theatre and drama.

CO2: Introduction to the origin of Sanskrit theatre.

CO3: Introduction to regional theatre.

CO5: To understand the forms of various plays and drama.

CO6: Introduction to folk theatre in Maharashtra.

Acting (TH) 1. Basic concepts of acting

CO1: To understand acting

CO2: To understand the concept of acting.

CO3: To study types of acting

CO4: To study actor and acting

CO5: To understand the actor's place in theatre

Theatre techniques (stage craft)

CO1: To introduce leaners to theatre techniques.

CO2: To understand scenic design.

CO3: To study costume design.

CO4: To understand make up and its significance.

CO5: To understand light design.

CO6: To learn background music.

Semester II History of Theatre (TH):

After studying the course, learners will be able to understand…..

CO1: Basic concepts of theatre

CO2: Origin of theatre and difference between theatre and drama

CO3: Eastern theatre, Japanese theatre, Chinese theatre, Indian theatre and Russian theater.

CO4: Indian contemporary theatre

Acting (TH):

Students will be able to understand ……

CO1: Voice modulation and speech story telling.

CO2: Qualities of an actor.

CO3: Mechanism of voice production.

CO5: Actor and Acting.

CO6: Applying the skills of an actor.

Theatre techniques (stage craft) (TH):

CO1: To set design, lights, costumes.

CO2: To design for play.

CO3: To utilize team in play.

Semester III Indian theatre.

CO1: To understand Marathi theatre: its history, origin, various trends.

CO2: To understand Sanskrit theatre, Bengali theatre, Kanada theatre etc.

Folk theatre of Maharashtra

CO1: Basic knowledge of folk theatre.

CO2: Students will understand different folk arts including Bharud, Kirtan, Tamasha, Songa Gondhal, Dashavtaar, Lahlit, Jagran etc.

CO3: To acquire the skills of folk arts.

Acting theory

Learners will understand …..

CO1: Bharatmuni

CO2: Stanislawski

CO3: Meyer hold

CO4: Badal sarkar

CO5: Rattan thiyam

CO6: Uttpal dutta

Semester IV Indian theatre

CO1: Understanding of history of Marathi Theatre (1843 to 1920).

CO2: Understanding of developements in Marathi theatre.

CO2: Types of play: Detailed study of forms of Comedy, Tragedy Tragic Comedy, Farce, Melodrama absurd.

Indian Folk Theatre:

Students will learn in brief about …..

CO1: Tamasha

CO2: Jatra Bhavai, Nautanki, Ramleela, Yakshagana

CO3: A study of Two Plays.

CO4: Study of Musical Marathi Theatre:

Folk theatre of Maharashtra

After completing the course, students will be able to understand …..

CO1: Difference between modern Marathi Theatre and Folk theatre.

CO2: Modern experimental plays, techniques, acting styles, new subjects and different styles of drama.

CO3: Basic language of folk theatre and folk style.

CO4: Traditional artist in Maharashtra.

CO5. Folk literature of theatre.

CO6: Contribution of folk theatre for India.

CO7: Some Marathi folk plays.

CO8: Theatrical languages.

Acting theory

Students will understand…..

CO1: Fundamental of Acting

CO2: Study of Yoga

CO3: Interpretation and Planning of Acting

CO4: Study of Great Actors

CO5: Acting Techniques

COs: Music

B. A. Music B.A.F.Y INDIAN CLASSICAL MUSIC (VOCAL & INSTRUMENTAL)

CO1: Introduction to the basic concepts of music, its importance and development.

CO2: Understanding of basic Alankaars & Raaga's.

CO3: Understanding of Indian classical music

CO4: Understanding of biographies of m

usicians

B.A.S.Y INDIAN CLASSICAL MUSIC (VOCAL & INSTRUMENTAL)

CO1: To develop singing ability.

CO2: To understand Khayal's with Aalap & Tanas

CO3: To understand musical, technical terms & their characteristics.

CO4: To understand singing and playing

B.A.T.Y INDIAN CLASSICAL MUSIC (VOCAL & INSTRUMENTAL)

CO1: To study of difficult Taalas with their laykaris.

CO2: To enhance ability to sing Gayaki & write Khayals with their notations.

CO3: To understand musical Gharanas.

CO4: To understand musical Granthas.

CO5: To understand history & development of music.

CO6: To provide an overview of applications of music & their Raaga therapy.

COs: M.A. Music

Paper –I History and development of Indian Music (First sem)

CO1: To understand Ragas with scientific information

CO2: To understand music of paleolithic age, mesolithic age, neolithic age, and metallic age.

CO3: To understand different cultures- Sindhu, Vedic, Pouranik, Ramayana, Mahabharata etc.

CO4: Classification of Indian instruments

CO5: Bio-graphical sketch and musical contribution of prominent musicians

Paper –II Science of Music

CO1: Detailed study of Ragas and scientific knowledge of notations in Talas

CO2: Detailed study of sound

CO3: Detailed study of techniques of sound

CO4: Classification of Ragas

(Second sem) : Paper -I

CO1: History and development of Indian Music.

CO2: Understanding of ragas with scientific knowledge.

CO3: Introduction to Music of various periods - Mughal, Maratha, Punjabi, Bengali etc.

CO4: Origin of Gharanas in music- its development, status, present and future perspectives.

CO5: Essays on subject related to music.

CO6: Understanding the Sahitya granthas

Paper –II

CO1: Understanding of Raga's with scientific information and ability to write the notations of proper talas

CO2: Understanding and application of Indian and Western notation system

CO3: Detailed study of stage performance and scientific theories

CO4: Study of Khand Meru and Swara Prastar

CO5: The theorems of Hindustani Sangeet

CO6: Applying music for mediation practices

Semester-III

Paper I History and development of Indian Music

CO1: Detailed understanding of Ragas, scientific information and ability to write the notations in Taals.

CO2: Detailed study of Ravindra Sangeet

CO3: Detailed study of musical music in Maharashtra

CO4: Understanding of Natya Sangeeet in Maharashtra

CO5: Detailed history and development and social importance of Satya

CO6: Contribution of prominent musician

CO7: Introduction to Indian music (1701 AD) to 1947 AD

Paper II Science of music

CO1: Detailed knowledge of Ragas

CO2: Contribution of significance of Electronic devises in music

CO3: Interrelation of music with other performing arts

CO4: Development of Saptak music

MA Second Year - Semester – IV

Paper –I History and Development of Indian music

CO1: Development of music in post-independence period (from 1747 and onwards)

CO2: Origin, history, development and salient features of folk music

CO3: Detailed understanding go Manch Pradarshan

CO4: Music for preservation of human values

Paper –II Science of music

CO1: Understanding of principles of voice culture

CO2: Understanding of principles of Nava Raga Nirmiti

CO3: Classification of Ragas

CO4: Detailed study of Thata Paddhati

CO5: Understanding and application of architectural acoustics

CO6: Applying Shudhha and Vikrit Swara

COs: Home Science

B. A. Home Science B.A. F.Y. Paper-1: Family Resource Management

CO1: To understand the family resources.

CO2: To acquire knowledge about the management process.

CO3: To develop ability to improve the work within less time, less resources & Fatique.

CO4: To understand types of saving, investments, make an income wise house budget.

CO5: To improve knowledge through consumer education.

B.A. F.Y. Paper- 2 Food & Nutrition:

CO1: Role of food and functions of nutrient.

CO2: Different sources and deficiencies of nutrients

CO3: Students can improve the nutritional quality of food & nutrition.

CO4: Develop practical skills & abilities.

CO5: To aware about own health & family.

B.A. F. Y. Paper - 3 HUMAN DEVELOPMENTS [Prenatal & Early Childhood]

CO1: To understand reproductive system of men & women.

CO2: To understand the importance of prenatal development.

CO3: To understand psychological problems of infancy & all over development of child.

CO4: To provide an overview of behavioral problems of early childhood & child rearing practice and effect on personality development.

B.A. F.Y. Paper- 4 [Textile & Clothing]

CO1: To improve ability for proper choice of fabrics.

CO2: To impart knowledge regarding textile & clothing.

CO3: To develop creative & technical skills in clothing construction.

CO4: To enable students to develop skills in embroidery.

CO5: To encourage entrepreneurship.

B.A. S.Y. Paper-5 [Extension Education]

CO1: To understand the importance & need of home science extension education.

CO2: To understand the process of communication in development work.

CO3: To get acquainted with the terms in extension approaches & models.

CO4: To know about the extension work & services under home science extension.

B.A. S.Y. Paper-6 [Textile & Clothing]

CO1: To impart knowledge about the basic principles of design & painting.

CO2: To develop knowledge & skill about wardrobe planning, selection of clothes for different age group, texture & fabric.

CO3: To know about important aspects of clothing.

B.A. S.Y. Paper-7 Child Development-[Late childhood & Adolescent]

CO1: To appreciate the sequential stages of development during the childhood.

CO2: To understand the behavioral problems during late childhood.

CO3: To aware need & skills to be developed for self-improvement.

CO4: To know the development & behavior during adolescence.

B.A. S. Y. Paper-8 Food& Nutrition

CO1: To understand the concept of an adequate diet & importance of meal planning.

CO2: To gain acquaintance with human gastro intestinal tract.

CO3: To know different methods of food preservation.

CO4: To understand nutrient needs for various age groups.

CO5: To be aware of effect of food poisoning & food adulteration.

B.A.T.Y. Paper -9 Marriage & Family Dynamics

CO1: To understand the merits & demerits of marriage & family.

CO2: To understand adjustments in marriage & family.

CO3: To leanrn the laws related to women, marriage and family.

CO4: To develop awareness about counseling.

B.A.T.Y. Paper -10 Housing & Interior Decoration

CO1: To recognize the role of housing the integrated development.

CO2: To know essentials of interior decoration.

CO3: To study the landscape designing & its application.

B.A.T.Y. Paper-11 Nutritional Management in Health & Diseases

CO1: To know the principles of diet therapy.

CO2: To understand the role of dietician.

CO3: To understand the modification of normal diet for therapeutic purpose.

B.A.T.Y. Paper-13 Human development [Adulthood & Oldage]

CO1: To know different aspects in adulthood.

CO2: To understand adjustments during adulthood.

CO3: To understand the nature of developmental pattern in adulthood & old age.

B.A.T.Y. Paper 14 Fundamental of Art & Design

CO1: To understand elements and principles of art & design.

CO2: To apply various colors and harmonies in design.

CO3: To develop skills in creating design & making art objects.

B.A.T.Y. Paper- 15 Communication process in Home-science

CO1: To understand the roll of communication in development.

CO2: To learn the process of communication effects of media.

CO3: To develop the skill in students about the use of communication methods & media.

CO4: To enable qualities of leadership in the students.

CO5: To know the importance of programme, planning, implementation, evaluation of programme.

COs: Physics

F. Y. B. Sc. Physics 101- Paper No I: Mechanics, properties of matter & sound:

CO1: To familiarize students with basic concepts of mechanics.

CO2: To have deep understanding of Newton's laws of gravitation and their applications.

CO3: To understand the concepts of viscosity and elasticity thoroughly.

CO4: To understand the phenomena of surface tension and its applications.

CO5: To understand the concept of ultrasonic and acoustics effectively.

CO6: To enable students to solve numerical problems.

Paper No II: Heat and Thermodynamics

CO1: To understand the concept of thermal conductivity and its application.

CO2: To understand the concept of real gases and transform phenomena.

CO3: To enable students to understand the laws of thermodynamics and thermodynamic processes.

CO4: To study the concept of entropy thoroughly.

CO5: To study heat engines and their efficiency.

CO6: To enable students to solve numerical problems.

Semester II 104- Paper No IV: Geometrical and Physical Optics

CO1: To familiarize students with basic concepts of optics.

CO2: To have deep understanding of cardinal points of optical system.

CO3: To understand the concept of interference thoroughly.

CO4: To enable students to summarize phenomena of diffraction and polarization.

CO5: To enable to solve numerical problems.

Paper No V: Electricity and Magnetism

CO1: To understand the basic concepts and laws in electrostatics.

CO2: To study the basic concepts and laws in dielectrics.

CO3: To get knowledge of the basic concepts and laws of magnetism.

CO4: To understand the basic concepts of transient current.

CO5: To enable students to solve numerical problems involving topics covered.

S. Y. B. Sc. Physics Semester III 201- Paper No VII: Mathematical, Statistical Physics and Relativity

CO1: To familiarize students with the mathematical methods used in physics.

CO2: To familiarize students with the vector algebra.

CO3: To get acquaintance with the differential equations.

CO4: To familiarize students with partial differential equations.

CO5: To familiarize students with classical and quantum statistics.

CO6: To understand the concepts of special theory of relativity.

CO7: To apply mathematical methods to solve problems in physics.

202- Paper No VIII: Modern and Nuclear Physics

CO1: To familiarize learners with basic properties of nucleus.

CO2: To have deep understanding of radioactivity and its applications.

CO3: To familiarize students with nuclear forces and elementary particles.

CO4: To understand construction and working of various particle accelerators and detectors.

CO5: To understand photoelectric effect.

CO6: To study different photoelectric cells.

CO7: To enable students to solve numerical problems.

Semester IV 205- Paper No XI: General Electronics

CO1: To familiarize students with basic electronic components.

CO2: To understand semiconductors.

CO3: To have deep knowledge of semiconductor devices.

CO4: To familiarize learners with transistor circuits and their characteristics.

CO5: To understand oscillators and multi vibrators.

CO6: To understand the process of modulation and demodulation.

CO7: To solve numerical problems.

206- Paper No XII: Solid state Physics

CO1: To familiarize students with basic concepts of structure of solids.

CO2: To familiarize students with characterization techniques.

CO3: To understand bonding and band theory of solids deeply.

CO4: To understand transport properties thoroughly.

CO5: To enable students to solve numerical problems.

T. Y. B. Sc. Semester V 54 301- Paper No XV: Classical and Quantum Mechanics

CO1: To understand the mechanics of the system of particles.

CO2: To understand d'Albert, principle, Langranges equation and its application.

CO3: To familiarize students with historical background of quantum mechanics.

CO4: To understand wave function and its physical interpretations.

CO5: To familiarize learners with time dependent and time independent Schrodinger equations and their applications.

CO6: To familiarize students with various operators used in quantum mechanics.

CO7: To enable students to solve numerical problems.

Paper No XVI: Electrodynamics

CO1: To familiarize students with various differential operators to study the Gauss law.

CO2: To familiarize learners with basic concepts and equations related to time varying fields such as Faradays law, Len's law etc.

CO3: To write expression for pointing vectors for electromagnetic waves.

CO4: To enable to write wave equations.

CO5: To solve numerical problems.

Semester VI 305- Paper No XIX: Atomic, Molecular Physics and LASER

CO1: To familiarize students with conceptual development of atomic model.

CO2: To understand one and two valence electron systems deeply.

CO3: To understand Zeeman Effect, Paschan back effect, Stark effect etc.

CO4: To understand Molecular Raman Spectroscopy.

CO5: To have deep introduction to lasers.

CO6: To familiarize students with different types of LASERS.

CO7: To understand construction and working of various types of LASERS.

CO8: To be aware with various applications of LASERS.

CO9: To enable students to solve numerical problems.

Paper No XX: Non-conventional Energy sources and Optical Fibers

CO1: To introduce students with various types of renewable energy sources.

CO2: To familiarize students with applications of solar energy.

CO3: To familiarize students with applications of biomass energy.

CO4: To familiarize students with wind mechanics.

CO5: To create awareness among students about energy conservation.

CO6: To familiarize students with optical fibers.

CO7: To familiarize students with applications of optical fibers.

CO8: To enable students to solve numerical problems.

COURSE OUTCOMES (COs) of Instrumentation Practice

F. Y. B. Sc. Instrumentation I

CO1: To familiarize students with deep knowledge of atom.

CO2: To have deep understanding of insulators and conductors.

CO3: To understand the concepts of color code to find the value of resistance.

CO4: To understand the phenomena of series, parallel combination of resistance and its applications.

CO5: To understand the concept of Kirchhoff's law of current and voltage.

CO6: To understand the concept of magnetism.

CO7: To understand the concept of transformer.

CO8: To enable students to solve numerical problems involving topics covered.

Paper No II: Instrumentation II

CO1: To understand the concept of instrument.

CO2: To enable leaners to find average measurement.

CO3: To understand the logarithmic representations.

CO4: To enable students to understand the basic measurement theory.

CO5: To study the concept of DC measurements.

CO6: To study analog AC measurement.

CO7: To enable the students to solve numerical problems involving topics covered.

Paper No IV: Instrumentation III

CO1: To familiarize students with basic concepts of n and p type semiconductors and diodes.

CO2: To have deep understanding of LCD.

CO3: To understand the concept of PNP and NPN transistor and their characteristics.

CO4: To enable students to transistor amplifier.

CO5: To understand OP –amplifiers.

CO6: To familiarize students with Timer IC 555.

CO7: To enable students to solve numerical problems.

Paper No V: Instrumentation IV

CO1: To understand the concepts of bridge circuits.

CO2: To study the MultiMate's.

CO3: To get knowledge of cathode ray oscilloscope.

CO4: To enable students to solve numerical problems.

Semester III Paper No VII: Instrumentation V

CO1: To familiarize students with digital numbering systems.

CO2: To familiarize students with binary code system inter-conversions.

CO3: To get acquaintance with Boolean algebra and Logic Gate Operation.

CO4: To familiarize students with partial differential equations.

CO5: To familiarize students with adders and subractores.

CO6: To apply mathematical methods to solve problems in physics.

Paper No VIII: Instrumentation VI

CO1: To familiarize students with OP-amplifiers with their applications.

CO2: To have deep understanding of voltage regulators such as LM 105, LM 723, LM7805, LM 7905 and LM 317.

CO3: To familiarize students with basic low pass and high pass filters.

CO4: To enable students to solve numerical problems.

Paper No XI: Instrumentation VII

CO1: To familiarize students with basic data controller devices.

CO2: To understand Flip-flops and Sequential Logics.

CO3: To have deep knowledge of J-K Flip flop, Flip flop timing parameters.

CO4: To be familiar with Counter Circuits and Shift Registers.

CO5: To understand Binary ripple counter, Decade counter, BCD counter, Shift register.

CO6: To understand the process of Digital to analog representations.

CO7: To solve numerical problems.

Paper No XII: Instrumentation VIII

CO1: To familiarize students with signal generators.

CO2: To familiarize learners with XR-2240 timer/counter, XR-2242 timer/counter.

CO3: To understand IC such as IC-556, IC-8038, XR-2206.

CO4: To understand LED and LCD.

CO5: To enable students to solve numerical problems.

Semester V Paper No XV: Instrumentation IX

CO1: To understand the mechanics of oscillators such as Sinusoidal, Colpitte's, Hartley Oscillators etc.

CO2: To understand multi vibrators such as transistorized, mono-stable, bi-stable Schmitt trigger etc.

CO3: To familiarize students with field effect transistors and its characterization.

CO4: To understand the instrumentation amplifiers such as multistage, power amplifiers etc.

CO5: To enable students to solve numerical problems.

Paper No XVI: Instrumentation X

CO1: To familiarize students with typical applications of instrument systems.

CO2: To familiarize learners with functional element of measurement systems.

CO3: To be able to write expression transducer and it's characteristics.

CO4: To be able to understand microcontroller systems.

CO5: To enable to select proper instrument for measurement.

CO6: To be able to solve numerical problems.

Semester VI Paper No XIX: Instrumentation XI

CO1: To familiarize students with medical instrumentation.

CO2: To understand biomedical recorder such as ECG, EEG, EOG etc.

CO3: To understand biological stimulation and controllers.

CO4: To understand LASER.

CO5: To familiarize students with applications of LASER.

CO6: To understand construction and working of different type of LASER.

CO7: To enable students to solve numerical problems.

Paper No XX: Instrumentation XII

CO1: To introduce students with transducers.

CO2: To familiarize students with different type transducers.

CO3: To familiarize students with intermediate elements.

CO4: To familiarize students with A/D and D/A converters.

CO5: To create awareness among students about indicating, recording, display instruments.

CO6: To familiarize students with calibration of instruments.

CO7: To enable students to solve numerical problems.

Physics- M. Sc. PHY-401: Mathematical Methods in Physics

CO1: To familiar learners with matrix algebra.

CO2: To familiar learners with Eigen values and Eigen vector spaces.

CO3: To familiar learners with different types of differential equations such as Legendre, hermite, laguerre etc along with special functions.

CO4: To understand details of Fourier series and its application such as elementary function, rectangular aperture, delta faction etc.

CO5: To understand Laplace's transformer of derivate and integral of a function.

CO6: To be able to solve numerical problems.

PHY-402: Classical Mechanics

CO1: To understand mechanics of a system of particle.

CO2: To understand Hamiltonian principle and techniques of calculus of variations.

CO3: To understand canonical transformations.

CO4: To study rigid body motion such as Eulerial angles and Coriolis force.

CO5: To be able to solve numerical problems.

Phy-403: Quantum Mechanics I

CO1: To be familiar with basic concepts of general formalism of Quantum Mechanics.

CO2: To have introduction with operators in Quantum Mechanics.

CO3: To understand angular and rotational momentum in quantum mechanical approach.

CO4: To understand the wave function and its physical interpretation clearly.

CO5: To familiarize with the time dependent and time independent Schrodinger equations and their applications.

CO6: To be able to solve numerical problems.

PHY-404: Linear and digital Electronics

CO1: To familiarize learners with special function ICs and their applications.

CO2: To have deep understanding of operational amplifiers and their applications.

CO3: To understand IC 555 timer and different type of gates.

CO4: To understand working of combinational and sequential logic circuits.

CO5: To understand working of various types of data converters.

CO6: To enable students to solve numerical problems.

PHY-405: Quantum Mechanics II

CO1: To understand WKB approximation and their applications.

CO2: To understand various types of perturbation theories.

CO3: To familiarize learners with scattering of waves.

CO4: To understand Kelvin Gordon equation and its interpretation.

PHY-406: Statistical Mechanics

CO1: To have deep understanding of statistical mechanics.

CO2: To understand different aspects of classical statistics.

CO3: To understand various aspects of quantum statistics.

CO4: To have deep understanding of classical ideal gas.

CO5: To enable students to solve numerical problems.

PHY-407: Electrodynamics and Plasma Physics

CO1: To be familiar with basic concepts and equations related to time varying fields.

CO2: To be able to write expressions for energy / force / momentum relations for electromagnetic waves.

CO3: To enable to write wave equations in terms of electromagnetic potentials.

CO4: To understand reflection and transformation of electromagnetic waves.

CO5: To familiarize learners with realistic electrodynamics.

CO6: To understand relativistic mechanics and four dimensional spaces.

CO7: To be able to solve numerical problems.

PHY-408: Atoms and Molecules Physics

CO1: To have deep understanding of atomic spectra.

CO2: To have deep understanding of molecular spectra.

CO3: To understand different types of couplings.

CO4: To familiarize students with different type of spectroscopies such as rotational, vibrational etc.

CO5: To understand the details of LASER and MASER.

Semester III PHY-409: General condensed matter physics

CO1: To understand band theory of solids and various aspects related to it.

CO2: To familiarize with different types of crystal structures.

CO3: To understand crystal diffraction and reciprocal lattices.

CO4: To understand thermal properties of solids.

CO5: To introduce with different models of energy bands in solids.

CO6: To solve numerical problems.

PHY-410: General Nuclear Physics

CO1: To familiarize with general properties and concepts of nuclei.

CO2: To understand mechanism of radiation detectors and nuclear models.

CO3: To understand mechanism of nuclear reactors and accelerators.

CO4: To solve numerical problems.

PHY-411: Special Paper-I (Electronics A1)

CO1: To understand mechanism of 8086 microprocessor.

CO2: To understand mechanism of data movement instruments.

CO3: To have deep understanding of 8-bits, 16-bits mathematical function.

CO4: To understand mechanism of program control instruments.

CO5: To have deep understanding of addressing modes.

CO6: To be aware of data movement instructions.

CO7: To be familiar with IC 8086 interfacing microcontroller.

PHY-412: Special Paper-II (Electronics A2)

CO1: To understand mechanism of microwaves and transmission theory.

CO2: To understand mechanism of microwave generators.

CO3: To aware students about the microwave components such as Gunn diode, mode of operation etc.

CO4: To make students able to operate microwave bench without distortion.

COs: Chemistry

B. Sc. Chemistry Paper I Inorganic Chemistry

CO1: To study the basics of atomic structure - Atomic orbitals, Quantum numbers, Heisenberg uncertainty, Aufbau and Pauli exclusion principles, Hund's multiplicity rule. Electronic configurations of the elements, Bohr's atomic model.

CO2: To understand some periodic properties - atomic and ionic radii, ionization energy, electron affinity and electro negativity with reference to trends in periodic table and application in predicting chemical behavior.

CO3: To study s- and p- block elements.

Paper No. II Organic Chemistry

CO1: To understand the basic concepts in organic chemistry- reactions, reagents and mechanisms of organic reactions.

CO2: To study stereochemistry and its importance.

CO3: To familiarize open chain compounds like alkanes, alkenes and aromatic compounds chemistry and their importance.

Paper V Physical Chemistry

CO1: To understand basic mathematical concepts - logarithmic relations, curve sketching, linear graphs and calculation of slopes, differentiation of functions simple mathematical functions, maxima and minima, partial differentiation.

CO2: To understand kinetic theory of gases, kinetic gas equation, and gas laws - Boyles Law, Charles Law, Grahams Law of diffusion, Avogadro's hypothesis, deviation from ideal behavior, van der Waals equation of state.

CO3: Critical Phenomena: PV isotherms of real gases.

CO4: To study chemical kinetics: Factors influencing the rate of reaction, rate law and characteristics of simple chemical reactions - zero order, first

order, second order, Pseudo order, half-life. Arrhenius equation, concept of activation energy. Catalysis: Definition, types, and characteristics, Enzyme catalysis.

CO5: To understand basics of liquid and solid state - Intermolecular forces, structures, liquid crystals: Classification, structure of nematic and cholestric phases.

CO6: To study solids, Miller Indices, laws of crystallography, X-ray diffraction by crystals. Derivation of Bragg equation.

CO7: To familiarize learners with colloidal state.

Paper VI Inorganic Chemistry - II

CO1: To understand chemical properties of the noble gases, chemistry of xenon, structure and bonding in xenon compounds.

CO2: To understand types of bonds- ionic, covalent and coordinate, Hydrogen bonding, Van-der-Waals forces, Metallic bond Theories of bonding - VBT, VSEPR, MOT with formation and shapes of molecules.

CO3: To understand the basics of nuclear chemistry - Isotopes, Isobars mass, Binding Energy, Packing fraction N/Z ratio, Radio activity, properties of fundamental particles, Artificial transmutation. Applications with respect to trans-uranic elements, carbon dating.

CO4: To study theory of volumetric analysis - Types of titrations, volumetric apparatus, calibration of pipette and burette, indicators used in pH - titrations, oxidizing agents used in titrations. Theory of internal, external and self-indicators for redox titration.

(Organic Chemistry) Paper IX

CO1: To understand structure, reactivity, methods of preparation and chemical reactions of different types of compounds - alcohols, Phenols, aldehydes-ketones, amines and carboxylic acids.

CO2: To study named reactions- Pinacol-Pinacolone rearrangement, Fries Rearrangement, Claisen Rearrangement, Gatterman Synthesis and

Reimer Tiemann Reaction, Baeyer-Villeger Oxidation, Benzoin, Aldol Knoenenagel condensations, Mannich Reactions. Hoffmann Bromamide Reactions, Gattermann Koch synthesis, Hell-Volhard-Zelinsky Reaction. Regents in organic chemistry – $LiAlH_4$, LTA, PTC.

CO3: To understand the basic functional group transformations, aromatic electrophilic substitution reactions, nucleophilic additions.

(Physical Chemistry-I) Paper X

CO1: To understand the basic concepts in thermodynamics.

CO2: To understand the laws of thermodynamics and terms like W, q, du and dH for the expansion of ideal gases under isothermal and adiabatic conditions for reversible process, Hess's law.

CO3: To study Carnot cycle, its applications, concept of entropy, Gibbs and Helmholtz Functions, Criteria for thermodynamic equilibrium and spontaneity, their advantage over entropy change. Variation A with P, V and T.

CO4: To understand equilibrium constant and free energy - law of mass action, Le Chatelier's principle, Reaction isotherm and reaction isochore, Clapeyron equation, Clausius-Clapeyron equation.

(Physical Chemistry-II) Paper XIV

CO1: To study the basic terms and laws- Henry law, Raoults law in phase equilibrium and their applications.

CO2: To understand different systems- Water, Pb-Ag, Mg-Zn, $FeCl_3$-H_2O, phenol-water, trimethyl amine - water, nicotine- water system, acetone-dry ice.

CO3: To understand the concept of ideal behavior and deviations from ideality.

CO4: To understand the concept of conductivity and its types, Kohlrausch's law, Arrhenius Theory of Electrolyte Dissociation, Ostwald's dilution law, Transport number: and its determination, Conductometric titrations.

CO5: To familiarize with types of reversible electrodes, Nernst Equation, Cell E.M.F., single electrode potential, Reference electrodes, Electro-chemical series, Electrolytic and galvanic cells, types of cells, Thermodynamic quantities of cell reactions, Concepts - pH, pKa and their determination, Buffers- types, and mechanism of action, Henderson- Hasselbalch equation. Corrosion: Concept, types and electrochemical theory.

(Inorganic Chemistry) Paper XIII

CO1: To familiarize students with transition elements, lanthanides and actinides with reference to characteristics, position in periodic table and variation in periodic properties.

CO2: To understand concepts and theories in coordination compounds - Werner's co-ordination theory, EAN rule, VBT, isomerism, chelates.

CO3: To understand the concepts of acids and bases - Arrhenius, Bronsted-Lawry, Lux-Flood, Solvent System and Lewis Concept of Acids and Bases

CO4: To study chemical reaction in non-aqueous solvents.

Paper XVII Physical Chemistry

CO1: To understand concepts in Quantum Mechanics - Black body radiation, Planck's radiation law, photoelectric effect, Bohr's modes of hydrogen atom, Compton Effect. De Broglie Hypothesis, Heisenberg's uncertainty principle, Harmiltonian operator, Schrödinger wave equation postulates of quantum mechanics. Schrödinger wave equation for H-atom.

CO2: To study the basics of spectroscopy - Electromagnetic radiation, regions of the spectrum, Born-Oppenheimer approximation, Rotational Spectrum - Diatomic molecules, energy levels of a rigid rotor (semi classical principles), selection rule, rotational spectra of rigid diatomic molecule, determination of bond length.

CO3: To understand photochemistry - Photochemical processes, laws of photochemistry, Grothus - Drapper law, Stark-Einstein law, Jablonsiki

diagram qualitative description of fluorescence, phosphorescence, nonradiative processes, quantum yield and photosensitized reactions.

CO4: To study some physical properties and their relation with the assingment of molecular structure- Optical activity, dipole moment, magnetic property.

CO5: To introduce nano-materials - Properties, methods of synthesis and applications.

CO6: To enable students to solve numerical problems.

Paper XVIII Organic Chemistry

CO1: To introduce learners to organic spectroscopy - ^{1}H NMR, shielding and deshielding, chemical shifts, interpretation of PMR spectra of simple organic molecules, combined problems on UV, IR and PMR spectroscopic techniques.

CO2: To familiarize students with organometallic compounds - Structure, methods of synthesis and synthetic applications of Grignard reagents, Organozinc and organolithium compounds.

CO3: To understand organic synthesis via enolates - Active methylene compounds, Claisen condensation, Acidity of alpha hydrogen and its synthetic applications.

CO4: To introduce fats, oils and detergents - Saponification value, iodine value, and acid value. Detergents preparation of sodium alkyl sulphonate, alkyl benzene sulphonate, and amide sulphonate, cleansing action of detergent.

Paper XIX Organic Chemistry

CO1: To understand nature of metal-ligand bonding in transition metal complexes - crystal field theory with respect to octahedral, tetrahedral and square planer complex.

CO2: To familiarize with electronic spectra of transition metal complexes.

CO3: To introduce organo metallic compounds - classification, nomenclature, synthesis and reactions.

CO4: To study the roles and biological functions of metals in biological systems.

CO5: To introduce chromatography - types, classification and applications.

Paper No. XVII Organic Chemistry

CO1: Curriculum benefits to study the heterocyclic compounds in details, their aromatic characters and importance in medicinal chemistry, structure elucidation of five and six member heterocyclic compounds using molecular orbital theory.

CO2: To understand synthesis and properties of some five and six member heterocyclic compounds.

CO3: To study carbohydrate chemistry and its importance.

CO4: To understand synthesis and properties of some polymers, polymerization reactions.

CO5: To know constitution, classification, synthesis and properties of some dyes.

CO6: To understand constitution, classification, synthesis, properties and applications of some drugs.

B. Sc. Analytical Chemistry ACH-101: Fundamentals of Anayltical chemistry:

After study the course, a student is able to understand:

CO1: Scope and importance of analytical chemistry.

CO2: Sampling of analytical samples.

CO3: Types of reagents, solvents and their uses.

CO4: Safe working in laboratory.

CO5: Introduction to digital electronics and computers.

ACH-102 Paper-II Basic Concepts of Analytical Chemistry

A student is able to understand:

CO1: Construction and working of mechanical and electronic analytical balance.

CO2: Chemical apparatus in laboratory and maintain of laboratory note book

CO3: Basics calculations in determination of concentration and ways of expressing concentration.

CO4: Common laboratory apparatus

CO5: Concepts of acids and bases.

ACH-201 Paper-IV Statistical Treatment & Modern Methods of Analysis:

Students will be able to understand …..

CO1: Terms in statistical data analysis.

CO2: Fundamentals of chromatographic techniques.

CO3: Principle, instrumentation and applications of electrophoresis and flame photometer.

CO4: Awareness to environmental pollution.

ACH-202 Paper-V Classical and Spectral Methods of Analysis

CO1: Basic concepts, in titrimetric methods of analysis.

CO2: Basic concepts in gravimetric analysis.

CO3: Introduction to spectral method of analysis- UV-visible spectroscopy.

CO4: Introduction to precipitation titration.

CO5: Fundamentals of complexometric titrations & some basic concepts of redox titrations.

ACH-301: Laboratory techniques: Inorganic and organic analysis

CO1: To understand theory of redox and idodometric acid-base indicators.

CO2: To study the basics of complexometric titrations.

CO3: To understand the methods of estimation of functional groups.

CO4: To understand the reactions of non-aqueous titrations.

CO5: To understand the common laboratory techniques.

ACH-302: Advance analytical techniques

CO1: To study the principles involved in solvent extraction.

CO2: To understand the basic principle, instrumentation and applications of gas, column, affinity and ion exchange chromatography.

ACH-305: Instrumental methods of chemical analysis-I

Learners will be able to understand…..

CO1: Basic concepts in conductometry.

CO2: Basic concepts and applications of potentiometry.

CO3: Introduction to high frequency titrations.

CO4: Principle, instrumentation and applications of atomic absorption spectroscopy, nephalometry and turbidometry.

ACH-306: Instrumental methods of chemical analysis-II

Learners will be introduced to…..

CO1: Principle, instrumentation and applications of polarography.

CO2: Physical methods of analysis-surface tension, viscosity etc.

CO3: Thermal methods of analysis - DTA, DSC.

CO4: Radiochemical methods of analysis.

CO5: Principle, instrumentation and applications of fluoremetry.

Paper ACH-501 Modern Technique in Analysis

Students will understand…..

CO1: Theory, instrumentation and applications of I. R.-Spectroscopy.

CO2: Theory, instrumentation and applications of NMR-Spectroscopy.

CO3: Theory, instrumentation and applications of mass spectrometry.

CO4: Theory, instrumentation and applications of fluorescence spectroscopy.

Paper ACH-502 Industrial Microbiological & Biochemical Analysis

CO1: To study industrial methods of analysis for the analysis of paints, pigments, pesticides.

CO2: To study methods of microbiological analysis.

CO3: To study biochemical analysis of protein, carbohydrates, nucleic acid and vitamins.

Paper ACH 601 Applied Analytical Chemistry-I

CO1: To study the analysis of minerals and ores, principles of ore dressing, analysis of iron ore, manganese ore, bauxite ore, beryl ore and dolomite ore.

CO2: To understand analysis of cement & coal: Main constituents, composition and analysis of cement & coal

CO3: To understand analysis of fertilizers: Definition, classification and analysis of fertilizers.

CO4: To study the analysis of water- color, odor, pH, taste, conductivity, dissolved solids, hardness, DO, COD, BOD, chlorides, sulphates, nitrites and phosphates.

CO5: To study the analysis of soil.

Paper ACH 602 Applied Analytical Chemistry-II

CO1: To introduce learners to food analysis.

CO2: To understand the analysis of food and food products: Milk, Butter-, Wheat flour, Beverages, Tea-, Coca-, Soft drink, Honey.

CO3: To study pharmaceutical analysis of some drugs -Classification of drugs, Analysis of-amoxycillin, analgin, proponolol, pilocarbine nitrate, rifampicin, paracetamol, nimuselide, ranitidine.

CO4: Introduction, composition of blood, blood component, collection & its preservation.

M. Sc. - I Organic and Analytical Chemistry CHE-101: Analytical Chemistry

CO1: To understand basic concepts in analytical chemistry - Role of analytical chemistry, qualitative and quantitative analysis, analytical processes of validation of a method.

CO2: To understand the methods of statistical treatment of analytical data.

CO3: To study the basic separation techniques in analytical chemistry.

CO4: To familiarize with different chromatographic techniques- theory, experimental and different parameters - TLC, column, liquid-liquid partition, gel permeation, ion exchange, gas and HPLC.

CHE-102: Inorganic Chemistry

CO1: To familiarize with different spectroscopic term symbols, Orgel diagrams and Tanabe Sugano diagrams for different configurations.

CO2: To understand the interpretation electronic spectra of metal complexes.

CO3: To study preparations, reactions and structures of metal carbonyls and nitrosyls and EAN rule.

CO4: To understand the chemistry of dioxygen, dinitrogen complexes and non-carbonyl metal clusters.

CO5: To understand bioinorganic chemistry involved in biological systems.

CHE-103: Organic Chemistry

CO1: To study aromatic electrophilic and nucleophilic substitutions with reference to orientation and reactivity, energy profile diagram, ortho/para ratio, IPSO substitution, orientation in other ring system, Recapitulation of halogenation, nitration, sulphonation and Friedel Craft's reaction, diazonium coupling.

CO2: To understand nucleophilic substitution - S_N^{Ar}, S_N1, benzyne mechanisum

CO3: Effect of substrate structure, leaving group and attacking nucleophile on reactivity.

CO4: To study reaction mechanism and reaction intermediates- carbocations, carbanions, free radicals.

CO5: To study mechanism and stereochemical aspects of addition reaction involving electrophile, nucleophile and free radicals.

CO7: To understand regioselectivity and chemo selectivity, orientation and reactivity in addition to carbon-carbon multiple bond; Michael addition, Sharpless asymmetric epoxidation.

CO8: Study of elimination and rearrangement reactions.

CHE-104: Physical Chemistry

CO1: To understand ionic equilibrium and biological reactions.

CO2: To study theories of reaction rates, kinetics of reactions, methods of determining rates of reactions.

CO3: To study classical and statistical thermodynamics.

CO4: To understand models involved in surface chemistry.

CO5: To understand advanced concepts in electrochemistry.

CHE-205: Spectroscopic methods of analysis

CO1: General introduction to spectral methods.

CO2: Basic concepts, instrumentation and applications of Microwave, Vibrational and Raman spectroscopy.

CO3: To understand photoelectron spectroscopy.

CO4: To study thermal methods of analysis –TGA, DTA.

CO5: To understand the principle, instrumentation, applications of UV, IR and NMR spectroscopy.

CO6: To enable students to structure elucidation of compounds using combined spectral data.

CHE-206: Inorganic chemistry

CO1: To understand spectroscopic term symbols, microstates, Orgel diagram.

CO2: Study of electronic spectra and magnetic properties of transition metal complexes.

CO3: To understand the preparation, properties and reactions of metal carbonyls and nitrosyls.

CO4: Inorganic chemistry of haemoglobin and myoglobin.

CHE-207: Organic chemistry

CO1: To understand aliphatic and aromatic electrophilic as well as nucleophilic substitutions reactions.

CO2: Mechanisms and sterochemical aspects of additions to C-C double bonds and carbon-heteroatom multiple bonds.

CO3: To understand various named reactions with their mechanisms.

CHE-208: Physical chemistry

CO1: To understand basics and advanced concepts in quantum mechanics.

CO2: To understand phase rule and its applications to different systems.

CO3: To study laws in crystallography, symmetry elements, and principles of crystal structure.

CO4: To understand concepts in photochemistry, photochemical processes and mathematical equations.

M.Sc. II- Organic Chemistry Structural elucidation by spectral methods [CHEO-313]

CO1: To understand spin-spin and different types of couplings.

CO2: To study principles and applications of mass and NMR Spectroscopy.

CO3: To study the basic principles and applications of Mossbauer and ESR spectroscopy.

CO4: To understand structure elucidation of organic molecules by analysis of spectral data.

Organic Synthesis [CHEO-314]

CO1: To study applications of different oxidizing reagents.

CO2: To study applications of various reducing reagents.

CO3: To understand methods of synthesis and synthetic applications of organic reagents in synthetic organic chemistry.

CO4: To study carbon-carbon and carbon-heteroatom bond forming reactions.

CO5: Study of ylides and enamines.

Asymmetric synthesis of and bio-organic chemistry [CHEO-315]

CO1: To understand classification and extraction of enzymes.

CO2: To introduce the students to enzyme catalysis.

CO3: To study chemical structure of co-enzymes and cofactors.

CO4: To study chiral poll and Falkinanh model.

Photochemistry, free radical and pericyclic reaction [CHEO-316]

CO1: To study the principles and applications of pericyclic reactions.

CO2: To understand electro-cyclic reactions and their applications.

CO3: To study importance of cyclo-addition reactions with examples.

CO4: To understand applications of photochemistry.

CO5: To understand free radical reactions.

Organic Synthesis retro synthetic Approach [CHEO-417]

CO1: To study importance and applications of disconnection approach.

CO2: To understand protecting groups for different functional groups in organic synthesis.

CO3: To study disconnection approach of cycloadition reactions.

CO4: To study disconnection strategies for ring synthesis.

CO5: To understand retro-synthesis of complex organic molecules.

Advanced organic and heterocyclic chemistry [CHEO-418]

CO1: To study structure, synthesis and reactions of mono and fused ring heterocyclic compounds.

CO2: To understand advanced named reactions in organic chemistry.

CO3: To study rearrangement reactions and their applications.

CO4: To study nomenclature and classification of heterocyclic compounds.

Chemistry of Natural product [CHEO-419]

CO1: To study terpenoides and carotenoids.

CO2: To understand chemistry of natural products and its applications.

CO3: To study sources, synthesis and applications of steroids.

CO4: To understand the biogenesis of natural products.

Medicinal Chemistry [CHEO-420]

CO1: To understand classification of drugs.

CO2: To study synthesis and applications of antibiotics drugs in common medicines.

CO3: To understand basic principles and applications of medicinal chemistry.

CO4: To study concepts in pharmacokinetics.

CO5: To understand synthetic pathways for the synthesis of common drugs.

M. Sc. Analytical Chemistry Paper: CHE-313

CO1: To familiarize students with spectral methods of analysis.

CO2: To understand H^1 NMR and its principles with structural elucidation.

CO3: To understand C^{13} NMR and its principles with structural elucidation.

CO4: To understand mass and its principle, working, terms related with mass and numericals.

CO5: To familiarize students with ESR, hyperfine splitting, and numericals.

CO6: To understand Mossbauer spectroscopy principle, working, terms related with Mossbauer, and numericals.

Paper: CHEA-314

CO1: To familiarize students with general introduction of electro analytical techniques and their applications.

CO2: To understand potentiometer, coulometer, their principles, working, types, techniques, applications.

CO3: To understand polarography & cyclic voltammetry -their principles, working, types, techniques applications.

CO4: To understand electrogravimetry - its principle, working, types, techniques, applications.

Paper: CHEA-315

CO1: To familiarize students with types of pollution, air pollution, effect of different pollutants on air, effect of pollution on climate, human, its analysis & control.

CO2: To understand water pollution, aquatic environment, trace elements causing water pollution, oxygen demanding, wastes, BOD, COD, monitoring techniques & methodology.

CO3: To understand soil analysis.

CO4: To understand industrial chemistry.

CO5: To familiarize students with green chemistry.

Paper: CHEA-316

CO1: To familiarize students with molecular luminescence spectroscopy.

CO2: To understand surface characterization by spectroscopy and microscopy.

CO3: To understand properties of supercritical fluid, principle, instrumentation, applications.

CO4: To understand radioactive nuclides and atomic X-ray spectroscopy.

CO5: To familiarize students with the principles and applications of LC-MS, GC-IR, GC-MS, ICP-MS and MS-MS.

CO6: To understand the principle of automation and flow injection analysis.

Paper: CHEA-417

CO1: To familiarize students with analysis of ores & alloys.

CO2: To understand analysis of paints & pigments.

CO3: To understand analysis of cement & building materials.

CO4: To understand analysis of glass.

CO5: To familiarize students with explosives and cosmetic analysis.

Paper: CHEA-418

CO1: To familiarize students with general concepts of food analysis.

CO2: To understand analysis of oils, fats & detergents.

CO3: To understand analysis of fertilizers & their classification.

CO4: To familiarize students with analysis of vitamins.

Paper: CHEA-419

CO1: To familiarize students with polymers & their classification.

CO2: To understand study of individual polymers.

CO3: To understand fuels and their analysis.

CO4: To familiarize students with petroleum, its occurrence and classification.

Paper: CHEA-420

CO1: To familiarize students with pharmaceutical analysis.

CO2: To understand pharmaceutical legislation.

CO3: To understand clinical analysis.

CO4: To familiarize students with forensic analysis, toxicology and classification.

CO5: To understand pharmaceutical analysis.

ACH - 202 papers - X Classical & spectral methods of Analysis.

After studying this course, students will be able to understand ….

CO1: Titrimetric method of analysis

CO2: Gravimetric analysis.

CO3: Spectral methods of analysis.

CO4: Precipitation titrations.

CO5: Complexometric titrations & some basic concepts of redox titrations.

COs: Mathematics

B. Sc. Mathematics Differential Equations

CO1: To understand homogeneous and separable first order differential equations.

CO2: To understand the exact differential equations.

CO3: To understand homogenous linear equations with constant coefficient and variable coefficients.

CO4: To find the solution of non-homogenous first order differential equations.

CO5: To find the solution of Bernoulli's equation.

Geometry

CO1: To understand geometrical terminology for plane, right line, sphere, cylinder and cone.

CO2: To know the geometrical results to find center and radius of the circle.

CO3: Students will be able to find equation of lines and planes in space.

CO4: Student will be able to find angle between two planes and length of perpendicular from a given point to a given line.

CO5: Students will be able to identify parallel and perpendicular lines.

Differential and Integral Calculus

CO1: To develop the concepts of limit, function, continuity, discontinuity and derivative.

CO2: Students become familiar with hyperbolic functions, inverse hyperbolic functions, derivatives, and higher order differentiation.

CO3: Students understand the consequences of Rolle's Theorem and mean value theorem for differentiable function.

CO4: Students understand definite integrals as the limit of a sum.

CO5: Student will be able to understand the concept of divergence, curl, gradient and it's applications.

Number Theory

CO1: Students will be able to find quotient and remainders from integer division.

CO2: Students apply Euclid's algorithm and backward substitutions.

CO3: Students understand the concept of congruence, residue classes and least residue.

CO4: Student will know the concepts - addition and multiplication of integers modulo.

CO5: Students will be able to solve linear congruence.

Numerical Methods.

CO1: Student becomes familiar with numerical solutions of nonlinear equations in a single variable.

CO2: Students will know the concepts - numerical interpolation and approximation of functions.

CO3: Student can solve first order initial value problem using Euler's method.

CO4: Student can solve first order initial value problem using a second order Runge- Kutta Method.

CO5: Students will be able to find numerical solution of ordinary differential equations.

Integral Transform and Partial differential Equations

CO1: Students understand the concept of beta and gamma functions and their applications.

CO2: Students are able use to Laplace transform to solve ordinary and partial differential equations.

CO3: Students can apply properties of Laplace transform to solve examples.

CO4: Students will know the difference between linear and nonlinear partial differential equations.

CO5: Student will be able to solve the linear and nonlinear partial differential equation by various methods like Lagrange's, Charpit's, Jacobi's, Monge's method.

Mechanics (I & II)

CO1: Students understand the concepts - particle, rigid body, force, equilibrium etc.

CO2: Students can find the components of velocity & acceleration in a given direction.

CO3: Students follow the concepts momentum, angular momentum, work, energy and points functions in mechanics.

CO4: Students will know the concept of projectile and motion of projectile.

CO5: Students will know differential and pedal equations of central orbits and their applications.

Abstract Algebra (I & II)

CO1: Students will understand the number systems and algebraic structures.

CO2: Students will understand the concept of ring and special types of rings.

CO3: Students can identify the difference between homomorphism and isomorphism of a group.

CO4: Students will know and apply the concepts of linear dependence and linear independence of vectors.

CO5: Students will be able to give the examples of inner product space.

Ordinary Differential Equations (I & II)

CO1: Students will know the difference between equation and differential equation.

CO2: Students will be able to find the solution of linear differential equation of first and second order.

CO3: Students will understand the initial value problem and its solutions.

CO4: Students will be able to understand the concept Wronskian of solution.

CO5: Students can find singular point and regular singular points of the differential equation.

Real Analysis (I & II)

CO1: Students become familiar with terminology sets, elements, operations on sets, functions, operations on functions.

CO2: Students can define & recognize basic properties of field of real numbers.

CO3: Students can understand the concept of series of real numbers, convergence and Divergence.

CO4: Students can understand metric space, continuous function on metric space and difference between open sets and closed sets.

CO5: Students will be able define Riemann integral, Fourier series and their applications.

M. Sc. Mathematics M.Sc. F. Y. (Mathematics) Abstract Algebra I & II

CO1: Students can solve a wide variety of problems based on Sylow theorems.

CO2: Students can understand fundamental theorem of finitely generated Abelian group.

CO3: Students can find order of a group and an element.

CO4: Students can evaluate basis and dimension of vector spaces.

CO5: Students can understand Galois theory.

Real Analysis I & II

CO1: Students will be able to know the extension of a measure.

CO2: Students can use technology tools to solve the problems of Riemann and Lebesgue integrals.

CO3: Students will be able to apply analytical and theoretical skills to models and solve problems based on measure spaces.

CO4: Students understand findings of derivatives.

CO5: Students can solve examples of general integral.

Topology (I & II)

CO1: Students will know the difference between open and closed sets on different topological spaces.

CO2: Students can know indiscrete and discrete topologies.

CO3: Students can understand when two topological spaces are Homeomorphic.

CO4: Students can identify the concept of connectedness, compactness and separation axioms.

CO5: Students can understand concepts of Bases, Sub-bases, Nets, Filters and Ultra filter.

Complex Analysis I & II

CO1: Students will know the basic concept of complex numbers.

CO2: Students can follow metric spaces and topology with respect to complex planes.

CO3: Students can learn the topics of Power series, Cauchy-Riemann equations and harmonic functions.

CO4: Student can understand complex integrations.

CO5: Students can learn the functions like Gamma function, Riemann Zeta function together with Weistrass factorization theorem.

Differential Equations (I & II)

CO1: Students will understand linearly dependence or independence of functions by using Wronskian of the functions.

CO2: Students can solve simple harmonic motion problems and damped motions problems.

CO3: Students can understand the concept of existence and uniqueness of solutions.

CO4: Students can solve the initial value problems and boundary value problems.

CO5: Students can apply the concept of maximum and minimum principle.

Functional Analysis

CO1: Students can apply many principles of real-analysis.

CO2: Students understand reflexivity of a Hilbert Space.

CO3: Students are able to learn projection and self-adjoin operators.

CO4: Students can define inner-product spaces and solve problems on it.

CO5: Students know normed linear spaces and Banach spaces.

Partial Differential Equations

CO1: Students can classify whether the second order partial differential equation is elliptic, hyperbolic or parabolic.

CO2: Students understand the concept of four fundamental equations. i. e. Laplace equations, transport equations, heat equations and wave equations.

CO3: Students understand mean value theorems, Green's theorem and Poison's equation.

CO4: Students can find solution of heat equation and wave equation.

CO5: Students can understand the Burger equation.

Numerical analysis

CO1: Students can apply the numerical methods. i.e. Bisection, False position, Newton-Raphson to solve nonlinear equations.

CO2: Students are able to find the errors and the rates of convergence.

CO3: Students can recognize iterative methods i.e. Jacobi- Gauss Seidel methods.

CO4: Students can understand numerical differentiation and numerical integration.

CO5: Students can apply the interpolation methods for solving the problems numerically.

CO6: Students will know the concepts of generalized co-ordinates and generalized momentum.

CO7: Students can find the isoperimetric problems and geodesic.

CO8: Students understand the planar and spatial motion of a rigid body.

CO9: Students understand the motion of a mechanical system using Lagrange-Hamiltonian Formulae.

Fuzzy Mathematics

CO1: Students know the concepts of Crips set and Fuzzy set theory.

CO2: Students understand the methods of fuzzy logic.

CO3: Students can recognize Fuzzy logic membership functions.

CO4: Students know the concepts of alpha- cuts and strong alpha- cuts.

CO5: Students understand the first and second characterization theorems.

Linear Integral Equations

CO1: Students can find solutions to initial value problems and boundary value problems.

CO2: Students can distinguish between point wise and uniform convergence.

CO3: Students can find derivatives of higher order.

CO4: Students can apply Laplace & Fourier transforms.

CO5: Students can identify whether given kernel is symmetric or separable.

Fluid Mechanics I & II

CO1: Students will know the types of fluids and Euler's equation, equation of continuity and Bernoulli's equation.

CO2: Students will understand the sources and sink.

CO3: Students can learn Blasius and Milne Thomson circle theorem.

CO4: Students can understand viscous flows.

CO5: Students will learn Navier-Stokes equations and its applications.

Operation Research I & II

CO1: Students can learn simple methods.

CO2: Students can handle transportations and assignments of problems.

CO3: Students will understand game theory.

CO4: Student can understand the sequencing problems of different types.

CO5: Students will be able to learn non-linear programming problems.

COs: Botany

B. Sc. Botany Diversity of Cryptogams-I

CO1: Introduction about basic plant groups like Algae and Fungi.

CO2: To equip the learners with all life science fundamental practical skills.

CO3: To aware learners about the economic and medicinal value of cryptogrammic plants.

Morphology of Angiosperms

CO1: To introduce to basic structure of plants.

CO2: To develop practical knowledge of Angiosperm plants.

Diversity of Cryptogams-II

CO1: To understand categories of plants with morphological features of Bryophytes and Pteridophytes.

CO2: To analyze the peculiar characteristic features of plant groups in relation with its internal characteristics.

CO3: To aware learners about economic and medicinal value of cryptogrammic plants.

Histology, Anatomy and Embryology

CO1: To understand internal structure of plant parts.

CO2: To apply theoretical knowledge in wood industry, forensic science.

CO3: To understand the development of seed and seed certification.

Taxonomy of Angiosperm

CO1: To familiarize with basic terminology, plant systematic and its different classification.

CO2: To identify angiosperm plants and their use.

Plant Ecology

CO1: Understanding of anatomical characterization of plants.

CO2: Study of eco-friendly conservation and sustainable utilization.

CO3: Students cop up with the ecosystem mechanism, analyzing plants ecosystem.

CO4: Understanding of ecological adaptations.

Gymnosperms and Utilization of plants

CO1: To make aware of economic and medicinal value of Gymnosperms and Angiosperms.

CO2: To understand important terminology in industrially and economically important higher plant species.

Plant Physiology

CO1: To understand plant physiology, life process, plant genetics and plant biotechnology.

CO2: To use the theoretical knowledge for advance study in plant sciences.

Cell and Molecular Biology

CO1: To create innovative approaches to aware the students in basic terminology of plant cells.

CO2: To understand cell at molecular level.

CO3: To apply theoretical understanding to the development of humankind.

Diversity of Angiosperms-I

CO1: to create awareness about the plant resources.

CO2: To classify plants on the basis of morphological aspects.

CO3: To participate in laboratory experiments for understanding the basic principles of life sciences and helpful for gaining primary information.

Genetics and Biotechnology

CO1: To study basic terms in Mendelian and non-Mendelian genetics.

CO2: To focus on biotechnological importance for improvement and satisfaction of all needs of human kind.

CO3: To understand plant biotechnology and its application in agriculture, horticulture, medicinal and industrial crops.

Diversity of Angiosperms-II

CO1: To study eco-friendly conservation and sustainable utilization of plants.

CO2: To understand flora.

Biology and Diversity of Bryophytes, Pteridophytes and Gymnosperms

CO1: To create the foundation of all plant life cycles of cryptogrammic plant species and it correlate with experimental techniques.

CO2: To understand characteristics of non-flowering primitive plants.

CO3: To aware the students about economic and medicinal values of cryptogrammic and gymnosperm plant.

Ecology and Conservation

CO1: To understand plant kingdom system and its ecology.

CO2: To distribute various biomes content for future higher environmental studies.

Biodiversity I

CO1: To study the major hotspots in world.

CO2: To increase confidence in students and percolate in research field.

CO3: To inculcate botanical techniques among the learners.

Biodiversity II

CO1: To demonstrate utility for different plant products.

CO2: To study numerical taxonomy, and modern methods of taxonomy.

M. Sc. Botany

BOT 401 Cell Biology

CO1: To enhance thinking ability.

CO2: To understand cell biology.

CO3: To design and execute an experiment.

BOT 402 Molecular Biology

CO1: To understand life processes at molecular level.

CO2: To understand molecular biology and its application in pharmaceutical, health, and agricultural industries.

CO3: To provide opportunity to enter in industries in biotechnology, and open avenues for answering basic and applied questions in life sciences.

BOT403 Biology and diversity of virus, phytoplasma, bacteria, algae and fungi

CO1: To study recent developments in plant science.

CO2: To understand flowering and non-flowering primitive plants.

CO3: To promote the interest of learners for selecting botany as a subject for higher education.

BOT Taxonomy of Angiosperms

CO1: To classify plants on the basis of morphological aspects with different classification systems.

CO2: To participate in laboratory experiments for understanding the basic principles of life sciences and helpful for gaining primary information.

CO3: To create awareness about the plant resources and to preserve them.

Seminars and Tutorial

CO1: To introduce recent developments in plant science.

CO2: To enhance, enthuse, sustain and promote the interest of learners.

Semester II BOT 405 Cytology and Genetics

CO1: to understand basic terms and their application in life sciences.

CO2: To develop opportunities in research, industry, pure or applied biology as well as teaching, media, government and management.

BOT 406 Plant developments and reproduction

CO1: To understand basic plant propagation techniques in horticulture and crop production.

CO2: To provide training in different skills for sustainable use of resources.

BOT 504 Genetic Engineering and Bioinformatics

CO1: To enhance understanding and competence in genetic engineering and bioinformatics.

CO2: To train provide skilled biologists with computer skills, database, tools and gene bank studies.

BOT 523 F Biodiversity III

CO1: To study different taxonomic tools.

CO2: To study diversity of plants.

BOT 524 F Biodiversity IV

CO1: To understand information about RET categorization.

CO2: To deal with global warming, red data book and species extinction.

CO3: To create public awareness.

CO4: To know the role of NGOS and industries in conservation of plants.

COs: Zoology

B. Sc. Zoology Protozoa to Annelida

CO1: To create awareness about fundamentals of invertebrate animals.

CO2: To understand the nature, classification of phylum system anatomy and development.

CO3: To equip students with life science fundamental practical skills.

Cell biology I

CO1: To understand structure and functions of cell organelles in animal cells.

CO2: To study cell structure and the process of cell division.

Protochordata

CO1: To introduce learners to higher invertebrates, morphological features, evolutionary development and connecting links and adaptations.

CO2: To analyze peculiar characteristics of animal groups in relation with internal characteristics.

Genetics-I

CO1: To understand important terminology in genetics, laws, & its applications.

CO2: To observe and calculate probabilities in cross, heredity and variations in genetics.

Vertebrate Zoology

CO1: To familiarize students with basic terminology and animal systematics.

CO2: To understand classification, anatomy and development of vertebrates.

CO3: To understand classification, morphological structures, identification of specimens and anatomy of some vertebrate animals.

CO4: To understand embryological process of development.

Genetics-II

CO1: To create awareness of mechanism of protein synthesis, DNA fingerprinting, recombinant DNA technology and rDNA.

CO2: To understand mechanism of protein synthesis and solve problems in genetics.

Animal physiology

CO1: To study animal processes.

CO2: To understand life processes through experiments.

Biochemistry & Endocrinology

CO1: To focus on biochemical processes - metabolism and catabolism process.

CO2: To inculcate advance study in biochemical reactions, principle, functioning and & uses of instruments.

Ecology

CO1: To study basic terms and subject applications in life sciences.

CO2: To understand basic information of types of ecosystems, role of living things in ecosystems and basic ecological concepts.

CO3: To analyze biotic, abiotic factors and animal interactions.

Entomology-I

CO1: To familiarize students with basic terminology of insects, biodiversity of insects, and their classification.

CO2: To understand morphology, economic importance and anatomy of insects.

CO3: To understand usefulness of insect and their role in agro based industries.

CO4: To enable students to participate in field collection and their identification to understand insect ecology.

Evolution

CO1: To study basic terms and subject applications in life sciences.

CO2: To participate in laboratory experiments for understanding the basic principles of evolution through models and helpful for gaining primary information.

Entomology-II

CO1: To understand the useful and harmful insects.

CO2: To familiarize students with basic terminology and damage caused by pest.

CO3: To identify and classify pest and life cycles for their management.

CO4: To know plant protection appliances and its application.

M. Sc. Zoology ZOO-401: Taxonomy and Animal diversity

CO1: To understand the scope of biological diversity and phylogenetic relationships underlying the organization of major groups of organisms.

CO2: To study importance of biodiversity to ecosystems and applied sciences such as medicine and agriculture.

CO3: To understand formation and functioning of cells, tissues, or organ systems are related in the context of biodiversity.

CO4: To demonstrate the ability to identify organisms to taxonomic groups.

CO5: To study phylogenetic trees.

ZOO-402: Ecology

CO1: To understand interactions of organisms with environment and the consequences of these interactions on population, community, and ecosystem dynamics.

CO2: To know the behavioral and physiological mechanisms by which organisms interact with each other and with their physical environment.

CO3: To understand the biotic and abiotic factoring the dynamics of populations, biodiversity of ecosystems responding to climate change or another disturbance.

CO4: To use ecological principles to explain the consequences of human activity.

ZOO-403: Biochemistry

CO1: To understand the fundamental biochemical principles governing complex biological systems.

CO2: To understand relation between biology and chemistry that emphasizes the significance of a solid foundation in natural sciences, including mathematics and physics.

CO3: To study fundamental biochemical principles, such as the structure/function of bimolecular, metabolic pathways, and the regulation of biological/biochemical processes.

CO4: To gain proficiency in basic laboratory techniques in both chemistry and biology.

CO5: Learners can apply the scientific information to processes of experimentation and hypothesis testing.

ZOO-421: Helminthological- I

CO1: To understand suitable conditions for the transmission of helminthes infections of livestock in a tropical environment.

CO2: To understand the basis for economical and sustainable control of helminthes infections in the tropics.

CO3: To discuss problem of anthelmintic resistance of helminthes in common parasitic zoonosis.

CO4: To understand the methods of veterinary inspection for prevention and control of helminthes zoonosis.

CO5: To understand methodology and importance of laboratory animals in helminthes diseases.

ZOO-411: General Animal Physiology

CO1: To understand the physiological processes in animals.

CO2: To understand nonmedical and veterinary sciences.

ZOO-412: Genetics

CO1: To understand the principles of inheritance from molecular level to population level, and learn applications of genetics to problems in integrative biology and ecology.

CO2: To describe the mechanisms governing Mendelian inheritance, gene interactions, gene expression and mechanisms that generates variation in traits.

CO3: To apply the principles of genetics to real-world problems in biology.

ZOO-413: Cell Biology

CO1: To understand the fundamentals of structure and function of cells as the basic units of all living things.

CO2: To study multicellular organisms, and the processes underlying development in organisms.

CO3: To identify and explain mechanisms from DNA to proteins, the components of sub-cellular infrastructure of a eukaryotic or a prokaryotic cell.

CO4: To understand the mechanism of cell communication drive development, behavior, or physiology.

CO5: To know the functions of individual cells in a given tissue of a multicellular organism.

ZOO-431: Helminthology II

CO1: To learn the immunology of helminthes and parasitic infections.

CO2: To understand the basis for economical and sustainable control of helminth infections in the tropics.

CO3: To discuss the problem of anthelmintic resistance of helminths and common parasitic zoonosis.

CO4: To introduce to students the dynamic relationship between helminth parasites and their hosts.

CO5: To operate current parasitological techniques and interpret parasitological parameters.

ZOO-501: Evolution, Animal behavior

CO1: To understand ecological relationships between organisms and their environment.

CO2: To understand the key concepts in evolutionary biology, history of life on earth, and phylogenetic relationships between organisms.

CO3: To demonstrate structure-function relationships in organisms.

ZOO-502: Quantitative Biology

CO1: To understand statistical significance and confidence intervals.

CO2: To understand mathematical modeling of a biological concept.

ZOO-503: Fundamental processes

CO1: To impart knowledge in evolving biological science at molecular level.

CO2: To understand the fundamental process governing life and information flow in cell.

CO3: To enhance research interest in molecular biology.

ZOO-524: Applied Parasitology- I

CO1: To introduce students to the basic concepts of parasitology.

CO2: To study host-parasite relationship.

CO3: To provide a broad perception of epidemiology, transmission, control and treatment of parasitic diseases.

CO4: To study life cycles, ecology and physiology of tropical parasites and their vectors.

ZOO-511: Developmental Biology

CO1: To study the broad phylogenetic relationships of animal phyla and some of the traits in evolutionary relationships.

CO2: To understand the critical contributions of sperm and eggs to the zygote.

ZOO-512: Methods in Biology

CO: Students will have a working knowledge of basic scientific equipment for collection and analysis of data.

ZOO-513: Applied Zoology

CO1: To can understand ethical principles and apply to biological/biomedical purpose.

CO2: To understand the role of biological/biomedical science, scientists, and practitioners in society.

ZOO-534: Applied Parasitology- II

CO1: To familiarize students with distribution, incidence, morphology, pathogenicity, and various diagnostic measures of some parasites of man and domestic animals.

CO2: To understand different parasites and carry out suitable practicals to diagnose each disease.

CO3: To introduce to the students to evasion of host responses by parasites.

Biotechnology

CO1: To develop practical approaches of tissue culture, single cell culture and mushroom culture.

CO2: To develop skills associated with recombinant DNA technology for application in food and agriculture industry.

Plant physiology and Metabolism

CO1: To inculcate the higher terminology in plant physiology for enthusiastic students in life sciences.

CO2: To understand plant metabolism and its use.

Seminars and Tutorial

CO1: To provide scientific and transferable skills through modular lecture courses, research projects, written work, and seminars.

COs: Computer Science

Computer Fundamental Course code: CSO1

CO1: To make the students familiar with computer environment.

CO2: To familiarize with the basics of Operating System and business communication tools

CO3: To identify parts of a computer system.

CO4: To explain adequately the functioning of computer components.

CO5: To understand problem solving using computers.

CO6: To design an algorithmic solution for a given problem.

Digital Electronics: Course code: CSO2

CO1: To familiarize with basic concepts of digital electronics.

CO2: To learn number systems and their representation.

CO3: To understand the basic logic gates, Boolean algebra and K-maps.

CO4: To study arithmetic circuits, combinational circuits and sequential circuits.

CO5: Study comparative aspects of logic families.

Operating System (CSO4)

CO1: To understand structures, functions and history of operating systems.

CO2: To understand designs and issues associated with operating systems.

CO3: To understand process management concepts including scheduling, synchronization, and deadlocks.

CO4: To familiarize learners with multi-threading.

CO5: To study master concepts of memory management including virtual memory.

CO6: To understand master system resources sharing among the users.

CO7: To understand issues related with system interface, implementation, disk management.

CO8: To familiarize with protection and security mechanisms.

Programming in C (CSO5):

CO1: To understand a programming language.

CO2: To apply problem solving techniques.

CO3: To enable learners to write programs in C-programming and to solve problems.

CO4: To read, understand and trace the execution of programs written in C language.

CO5: to write the C code for a given algorithm.

CO6: To implement programs with arrays and functions.

Course code: CS07: Advance C-Programming.

After completing the course, learning will be able …..

CO1: To create user defined functions for specific task in C language.

CO2: To understand the functions, types and working in C programming.

CO3: To understand use of user defined data types such as structures & unions.

CO4: Students will be able to deal with memory using pointers.

CO5: To understand library functions and storage classes in C language.

CO6: To learn pre-processor directives and operators in C language.

CO7: To study files stored on computer memory using file handling.

Course code: CS08 - Data Structure:

CO1: Student will be able to choose appropriate data structure as applied to specified problem definition.

CO2: Student will be able to handle operations like searching, insertion, deletion and traversing mechanism on various data structures.

CO3: Students will be able to apply concepts learned in various domains like DBMS, compiler construction etc.

CO4: Students will be able to use linear and non-linear data structures like stacks, queues, linked list etc.

Course Code: CS011 - Programming in CPP:

CO1: To understand basic object oriented concepts & issues involved in effective class design.

CO2: To write C^{++} programs involving the use object oriented concepts such as information hiding, constructors, destructors, inheritance etc.

Course Code: CS012 - DBMS Using SQL:

CO1: Understanding the database system basic concepts, architecture, features, purpose, and advantage of DBMS.

CO2: Learning about the component of a DBMS: Users, facilities & structure.

CO3: Learning about data modeling & design.

CO4: Learning about entity-relationship and data model.

CO5: Understanding the basics of relational model, normalization, relational algebra.

CO6: Introduction to oracle.

CO7: Student will able to deal with database system using SQL to manipulate data.

CO8: Understanding of physical storage of data.

CO9: Learning architecture of database system.

CO10: Learning about transaction processing and concurrency control.

CSO15- Software Engineering:

CO1: To manage selection and initiation of individual projects and of portfolios of projects in enterprise.

CO2: To conduct project planning activities that accurately forecast project costs, timelines, and quality.

CO3: To implement processes for successful resource, communication, risk and change management.

CO4: To demonstrate effective project execution and control techniques that result in successful projects.

CO5: To conduct project closure activities and obtain formal project acceptance.

CO6: To demonstrate a strong working knowledge of ethics and professional responsibility.

CO7: To demonstrate effective organizational leadership and change skills for managing projects, project teams, and stakeholders.

CSO16-VB .Net:

CO1: To understand the structure and model of programming language VB .Net

CO2: To use the programming language VB.Net for programming technologies.

CO3: To develop software in VB .Net.

CO4: To evaluate user requirements for software functionality required to decide whether the programming language VB .Net can meet user requirements.

CO5: To solve the given problem by applying technologies using implementation of VB.Net programming language.

CO6: To choose an engineering approach for solving problems, starting from acquired knowledge of programming and operating systems.

CSO19 -Data Communication and Networking:

Students will be able to…..

CO1: Understand types of networks, technologies and application of networks.

CO2: Understand types of addresses and data communication.

CO3: Understand the concept of networking models, protocols and functionality of each layer.

CO4: Learn basic networking hardware and tools.

CO5: Understand wired and wireless networks, its types, functionality of layer.

CSO20- Ethics and Cyber Law:

CO1: To describe laws governing cyberspace and analyze the role of internet governance in framing policies for internet security.

CO2: To discuss different types of cybercrimes and analyze legal frameworks of different countries to deal with these cybercrimes.

CO3: To explain the importance of jurisdictional boundaries and identify the measures to overcome cross jurisdictional cyber-crimes.

CO4: To illustrate the importance of ethics in legal profession and determine the appropriate ethical and legal behavior according to legal frameworks.

CO5: To identify intellectual property right issues in cyberspace and design strategies to protect intellectual property.

CO6: To assess legal issues with online trading, analyze applicable e-contracting and taxation regulations.

CO7: To create security policy to comply with laws governing privacy and develop policies to ensure secure communication.

COs: BCA (Science)

BCA (Science) CA101-T-Computer Fundamental:

CO1: To familiarize students with computer environment.

CO2: To familiarize learners with the basics of Operating System and business communication tools.

CO3: To identify parts of computer system.

CO4: To explain functioning of computer components.

CO5: To explain the process of problem solving using computers.

CO6: To design an algorithmic solution for a given problem.

CA102-T- Digital Electronics:

CO1: To familiar with concepts of digital electronics.

CO2: To learn number systems and their representation.

CO3: To understand basic logic gates, Boolean algebra and K-maps.

CO4: To study arithmetic circuits, combinational circuits and sequential circuits.

CO5: To study comparative aspects of logic families.

CA103-T- 8086 Microprocessor:

CO1: To understand basic architecture of 16 bit microprocessors.

CO2: To understand interfacing of 16 bit microprocessor with memory and peripheral chips involving system design.

CO3: To understand techniques for faster execution of instructions and improve speed of operation and performance of microprocessors.

CO4: To understand microprocessor instruction sets, assembly language programming.

CO5: To write programs to run on 8086 microprocessor based systems.

CA104-T-Programming in C –I:

CO1: To enable students to learn a programming language.

CO2: To apply problem solving techniques.

CO3: To write programs in C language.

CO4: To read, understand and trace the execution of programs written in C language.

CO5: To write the C code for a given algorithm.

CO6: To implement programs with pointers, arrays, perform pointer arithmetic, and apply the pre-processor.

CO7: To write programs using derived data types.

CA105-T -Communication skills:

CO1: To demonstrate preparation and research skills for oral presentations.

CO2: To develop proper listening skills.

CO3: To articulate and enunciate words and sentences clearly and efficiently.

CO4: To enhance confidence and clarity in public speaking projects.

CO5: To demonstrate ability to gather information and apply it to persuade or articulate one's own point of view.

Goal Two: Written Communication

CO1: To understand the rules of spelling and grammar.

CO2: To read, analyze text and apply ideas in writing.

CO3: To organize thoughts in a manner that emphasizes flow and paragraph development.

CO4: To acquire proper footnoting and bibliography skills.

CO5: To understand writing techniques and styles based on the communication medium.

Course code: CA106-T - Mathematical Foundation:

CO1: To distinguish between statement logic and predicate logic.

CO2: To visualize data numerically and/or graphically.

CO3: To evaluate mathematical principles and logic design.

CO4: To apply induction, proof techniques towards solving recurrences and problems in elementary algebra, adapt, and design elementary deterministic and randomized algorithms to solve computational problems.

CO5: To illustrate the basic terminology of functions, relations, and sets and demonstrate knowledge of their associated operations and understanding of mathematical modeling with appropriate examples.

CO6: To demonstrate effectively mathematical ideas/results verbally or in writing and apply the knowledge of computing and mathematics.

CO7: To understand functions and distinguish different types of functions.

CO8: To identify and describe different relations.

CO9: To explain graphs to formulate computational problems.

CO10: To develop ability to solve recurrence relations.

107P - Office Suite Practical (LAB):

A student will be able to ….

CO1: Demonstrate mechanics and uses of word tables to organize and present data.

CO2: Demonstrate working knowledge of using Word's themes and clip art to create a variety of visual effects.

CO3: Demonstrate working knowledge of Word's advanced formatting techniques and presentation styles.

CO4: Demonstrate applicable knowledge and uses of accepted business style formatting conventions.

CO5: Create and design a spreadsheet for general office use.

CO6: Demonstrate the basic mechanics of creating a power point presentation.

CA107P - Digital Electronics Practical (LAB)

A student will be able to …..

CO1: Understand and apply use of analog signals to represent digital values in logic families, including characterization of the noise margins.

CO2: Create appropriate truth table from a description of a combinational logic function.

CO3: Create a gate-level implementation of a combinational logic function described by a truth table using and/or/inv gates.

CO4: Evaluate combinational and sequential logic designs using metrics.

CA109-P - Microprocessor-I (8086) Practical (LAB):

A student is able to understand …..

CO1: Intel 8086 microprocessor architecture and real mode memory addressing.

CO2: Intel microprocessor addressing modes.

CO3: Assembly language programming and debugging.

CO4: Arithmetic calculations using 8086 microprocessor kit.

CO5: Transfer of data and exchange of data between various memory units.

CA110-P - C Programming-I Practical (LAB)

A student is able to …..

CO1: Understand the fundamentals of C-programming.

CO2: Choose loops and decision making statements to solve the problem.

CO3: Implement different operations on arrays.

CO4: Basic mathematical calculations.

CA201-T - Data Structures:

CO1: Students are able to choose appropriate data structure as applied to specified problem definition.

CO2: Students can handle operations such as searching, insertion, deletion, traversing mechanism etc. on various data structures.

CO3: Students can apply concepts learned in various domains like DBMS, compiler construction etc.

CO4: Students can use linear and non-linear data structures like stacks, queues, linked list etc.

CA202-T -Operating System:

Leaners will be able…..

CO1: To understand functions, structures and history of operating systems.

CO2: To understand design issues associated with operating systems.

CO3: To understand process management concepts including scheduling, synchronization, and deadlocks.

CO4: To familiarize with multithreading.

CO5: To study concepts of memory management including virtual memory.

CO6: To understand resources sharing among the users.

CO7: To understand master issues related with file system interface, implementation and management.

CO8: To familiarize with protection and security mechanisms.

CO9: To familiarize with various types of operating systems including UNIX.

CA203-T - I.T. Tools & Web Designing –I:

CO1: To learn understand the basics of internet and web designing.

CO2: To understand architecture of browser, server, web page, web sites & clients.

CO3: To know about internet domains, protocols, browser and server communication.

CO4: To know the basic knowledge of HTML and DHTML language for web page development.

CO5: To understand concepts of internet programming using JavaScript.

CA204-T - C-Programming-II:

CO1: To understand creation of user defined functions for specific task in C language.

CO2: To understand about functions and its types and working.

CO3: To understand use of user defined data types such as structures & unions.

CO4: To enable students for dealing with memory using pointers.

CO5: To get information about library functions and storage classes in C language.

CO6: To get knowledge about preprocessor directives and different operators used in C-language.

CO7: To deal with files stored on computer memory using file handling.

CA205-T - Communication Skill –II:

Leaners will be able…..

CO1: To demonstrate preparation and acquire skills for oral presentations.

CO2: To develop proper listening skills.

CO3: To articulate and enunciate words and sentences clearly and efficiently.

CO4: To show confidence and clarity in public speaking projects.

CO5: To demonstrate ability to gather information and apply it to persuade or articulate.

Goal Two: Written Communication

CO1: To understand the rules of spelling and grammar.

CO2: To read and analyze text and enable learner to summarize ideas in writing.

CO3: To organize thoughts in a manner that emphasizes flow and paragraph development.

CO4: To learn proper footnoting and bibliography skills.

CO5: To understand different writing techniques and styles based on communication medium being used.

CO6: To develop group communication skill.

CO7: To develop listening comprehension, reading comprehension and vocabulary.

CA206-T -Numerical Methods:

CO1: To demonstrate understanding of common numerical methods and their application to obtain approximate solutions to intractable mathematical problems.

CO2: To apply numerical methods to obtain approximate solutions to mathematical problems.

CO3: To derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations.

CO4: To analyze and evaluate the accuracy of common numerical methods.

CA207-P -Data Structure (LAB):

CO1: To understand the concepts of dynamic memory management, data types, algorithms, big O notation.

CO2: To understand basic data structures such as arrays, linked lists, stacks and queues.

CO3: To describe hash function and concepts of collision and its resolution methods.

CO4: To solve problem involving graphs, trees and heaps.

CO5: To apply algorithm for solving problems like sorting, searching, insertion and deletion of data.

CA208-P -I.T. Tools & Web Designing – I (LAB):

A student will be able to …..

CO1: Explain the history of internet and related internet concepts that are vital in understanding web development.

CO2: Discuss the insights of internet programming and implement complete applications over the web.

CO3: Demonstrate important HTML tags for designing static pages and separate design from content using Cascading Style sheet.

CA209-P- C Programming – II (LAB):

The course will enable students to …..

CO1: Implement programs with pointers and arrays, perform pointer arithmetic, and the use of pre-processor.

CO2: Write programs that perform operations using derived data types.

CO3: Use pointers and user defined data types.

CO4: Use functions used in C language.

CA210-P - Numerical Method (LAB):

A student will be able to …..

CO1: Identify different mathematical problems and reformulate appropriately for numerical data treatment.

CO2: Choose appropriate numerical methods for treatment of a given problem.

CO3: Explain choice of method by accounting for advantages and limitations.

CO4: Choose an algorithm that implies efficient calculations and implement in a programming language, suited for calculations.

CO5: Estimate reliability of results.

CO6: Use functions from the programming language library for efficient calculations and visualization.

CO7: Apply computer science for the solution of practical problems.

CA301-T - Database Management System:

CO1: To understand database system, basic concepts, architecture, features, purpose, advantage of DBMS.

CO2: To learn about component of a DBMS: Users, facilities & structure.

CO3: To learning about data modeling & design.

CO4: To learn about entity-relationship data model.

CO5: To understand basics of relational model, normalization, relational algebra.

CO6: To introduce students to oracle s/w.

CA302-T - Mobile Maintenance -I:

CO1: To study basic electronics and microcomputers.

CO2: To enable learners to handle mobile phones with the knowledge of testing batteries and battery charger.

CO3: To gain the knowledge of different mobile phones and also able to handle it.

CO4: To identify different chips and crystals on mobile PCB board.

CO5: To understand motherboard and different softwares for mobile repairing.

CA303-T - Principle of Management:

CO1: To understand basic concepts, scope, importance and evaluation of management.

CO2: To handle administrative section by applying work authority and responsibility.

CO3: To learn functions of management such as planning, organizing, staffing and so on.

CO4: To understand human factors in business administration and organization.

CO5: To enable learners to control and coordinate with colleagues.

CA304-T -Programming in CPP:

CO1: To acquire an understanding of basic object oriented concepts and issues involved in effective class design.

CO3: To write C^{++} programs that use object oriented concepts such as information hiding, constructors, destructors and inheritance.

CA305-T - Personality Development:

CO1: To develop and exhibit and accurate sense of self.

CO2: To develop and nurture a deep understanding of personal motivation.

CO3: To develop an understanding of practice of personal and professional responsibility.

CO4: To enhance self-confidence.

CO5: To identify, understand, and apply contemporary theories of leadership to a wide range of situations and interactions.

CO6: To develop and articulate personal philosophy of leadership.

CO7: To understand concepts of democratic leadership and processes.

CA306-T -Statistical Method:

CO1: To prepare for competitive examinations.

CO2: To apply statistics in real life.

CO3: To understand and calculate various types of averages and variations.

CO4: To understand application of discrete & continuous probability distributions to various business problems.

CO5: To understand organization, management, and data presentation.

CO6: To carry out exercises and small projects incorporating data presentation.

CO7: To demonstrate ability to write reports of statistical analysis giving summaries and conclusions using nontechnical language.

CA307-P - Programming in C++ & aDBMS (LAB):

A student will able to …..

CO1: Use C++ functions and concepts related to good modular design.

CO2: Apply one-dimensional and two-dimensional arrays.

CO3: Use C++ structures.

CO4: Understand pointers and reference parameters.

CO5: Use text file input/output

CO6: Understand C++ classes.

CO7: Explain features of database management systems.

CO8: Design conceptual models of a database using ER modeling.

CO9: Understand basics of relational model, normalization, relational algebra.

CO10: Understand basics of oracle s/w.

CA308P- Mobile Maintenance-I & SM using Excel (LAB):

A student will be able …..

CO1: To understand the basic internal structure of mobile phones.

CO2: To learn how to connect the mobile chips and battery.

CO3: To explain different types of mobile phones with its IC's.

CO4: To learn applications and security issues of mobile phones.

CO5: To draw the different graphical representation of the raw data in statistical method using excel.

CO6: To differentiate graphs.

CO7: To describe the quantitative results easily.

CO8: To handle statistical functions of excel.

CA401-T - Advance Database Management System:

CO1: Student will able to deal with database system using SQL to manipulate data.

CO2: Understanding of physical storage of data.

CO3: Understanding of architecture of database system.

CO4: Learning about transaction processing and concurrency control.

CA402-T - Advance Mobile Repairing:

CO1: Student will understand of mobile phone technology.

CO2: Student will be familiarized with microchip and microprocessor technology.

CO3: Student will get practical training of handling various components of mobile phone.

CO4: Learning of circuit diagram of mobile phone with complete software installation.

CO5: Student will be able to find the fault in hardware and software.

CO6 : Student can read the track of mobile phone.

CA403-T - Software Project Management:

CO1: To manage selection and initiation of individual projects and of portfolios of projects in enterprise.

CO2: Implement processes for successful resource, communication, risk and change management.

CO3: To conduct project planning activities that accurately forecast project costs, timelines, and quality.

CO4: To demonstrate effective project execution and control techniques that result in successful projects.

CO5: To conduct project closure activities and obtain formal project acceptance.

CO6: To demonstrate a strong working knowledge of ethics and professional responsibility.

CO7: To demonstrate effective organizational, leadership and skills for managing projects, project teams, and stakeholders.

CA404-T - Core Java

CO1: To implement object oriented programming concepts.

CO2: To use and create packages and interfaces in a Java program.

CO3: To use graphical user interface in Java programs.

CO4: To create applets.

CO5: To implement exception handling in Java.

CO6: To implement multithreading.

CO7: To use Input/output streams.

CO8: To handle security implementations in Java.

CA405-T - Aptitude and Logical Reasoning:

CO1: To prepare for competitive examinations.

CO2: To evaluate critically various real life situations by resorting to analysis of key issues and factors.

CO3: To read in between the lines and understand language structures.

CO4: To demonstrate principles involved in solving mathematical problems and reducing the time taken for performing job functions.

100 CA406-T - Linear Programming Problem (LPP):

CO1: To know the role of linear programming.

CO2: To understand applications of linear programming.

CO3: To define LPP and formulate the LPP in general and graphical form.

CO4: To understand methods of LPP.

CO5: To learn transportation and assignment problems using simple steps.

CA407-T - Programming in Java &Adv. DBMS using SQL (LAB):

A student will able to …..

CO1: Understand structure and model of Java programming language.

CO2: Use the Java programming language for various programming technologies.

CO3: Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements.

CO4: Propose the use of certain technologies by implementing in Java programming language to solve a given problem.

CO5: Choose an engineering approach to solve problems, starting from the acquired knowledge of programming and knowledge of operating systems.

CO6: Define database system concepts and apply normalization to the database.

CO7: Explain the basic processing and optimization techniques for high level query.

CO8: Describe different transaction processing concepts and use different concurrency control techniques.

CO9: Discuss different types of databases such as object oriented and distributed databases.

CO10: Identify different types of database failures and techniques to recover from such failures.

CO11: Discuss advanced database technologies and products used in enterprise.

CA408-T - Mobile Maintenance-II & Mini project (LAB):

A student will able to….

CO1: Know various features of mobile phones.

CO2: Handle internal part of mobile.

CO3: Handle software's of mobile phones.

CO4: Formulate a real world problem and develop its requirements.

CO5: Develop a design solution for a set of requirements.

CO6: Test and validate conformance of the developed prototype against the original requirements of problem.

CO7: Work as a responsible member and possibly a leader of a team in developing software solutions.

CO8: Express technical and behavioral ideas and thought in oral settings.

CO9: Prepare and conduct oral presentations.

CO10: Self learn new tools, algorithms, and/or techniques that contribute to software solution of the project.

CO11: Generate alternative solutions, compare them & select optimum one.

Code: CA501-T - Software Project Management II:

CO1: To recognize, trace and resolve IT related crises using project management software.

CO2: To identify the impact of IT projects on the performance of organizations.

CO3: To manage the phases and infrastructure of IT projects.

CO4: To develop strategies to calculate risk factors involved in IT projects.

CO5: To use project management software to control the design, implementation, closure, and evaluation of IT projects.

CO6: To estimate, plan, calculate, and adjust project variables.

CA502-T - Computer Graphics-I:

CO1: To learn basic concepts in computer graphics which includes different input-output devices and graphics file formats.

CO2: To use different functions of graphics for creating objects.

CO3: To be able to move an object from one place to another, rotate, scale, reflect the object easily.

CO4: To generate character / alphabets using various methods.

CA503-T- Core Java-II:

CO1: To understand input/output stream used in java.

CO2: To learn different utilities in java language.

CO3: To have an overview of database access and details for managing information using JDBC API.

CO4: To enable learners to write simple GUI interfaces for a computer program, to interact with users, and understand event-based GUI handling principles.

CO5: To learn use of Java applets for creating interactive web programs: Fonts, color, graphics, and animation.

CO6: To understand use of Java applets to create interactive web programs by sending and receiving parameters in an applet.

CA504-T- Data Warehousing:

CO1: To evaluate models of OLAP and data pre-processing.

CO2: To enlist algorithms used in information analysis of data mining techniques.

CO3: To demonstrate the knowledge retrieved through solving problems.

CA506-T - Data Communication & Networks

CO1: To understand types of networks, technologies and applications of networks.

CO2: To understand types of addresses and data handling.

CO3: To understand networking models, protocols and functionality of each layer.

CO4: To learn basics of networking hardware and tools.

CO5: To understand wired and wireless networks, their types, functionality of layer.

CO6: To understand the importance of network security and cryptography.

Course Code: CA507-T- Beginners Programming with PHP

CO1: To understand server-side programming works on the web.

CO2: To learn PHP Basic syntax for variable types and calculations.

CO3: To create conditional structures.

CO4: To store data in arrays.

CO5: To use PHP built-in functions for creating custom functions.

CA509-P - Pr. Based on Comp. Graphics & Pr. Based on Core Java-II (LAB):

CO1: To study and make an object based on graphical functions.

CO2: To learn drawing of different shapes using various algorithms.

CO3: To handle various movements of an object for animation - translate, rotate, scaling and reflection.

CO4: To understand input/output stream in Java.

CO5: To learn utilities in Java language.

CO6: To have an overview of database access and details for managing information using the JDBC API.

CO7: To write simple GUI interfaces for a computer program, interact with users, and understand the event-based GUI handling principles.

CO8: To learn use of Java applets to create interactive web programs: Fonts, color, graphics, and animation.

CO9: To learn use of Java applets to create interactive web programs by sending and receiving parameters in an Applet.

CA510-P -Pr. Based on DCN & Pr. Based on PHP (LAB):

CO1: To describe standard network models.

CO2: To understand guided transmission media.

CO3: To analyze error detection and error correction codes.

CO4: To understand the concepts behind medium access control sub layer.

CO5: To understand working of server-side programming on the web.

CO6: To learn PHP basic syntax for variable types and calculations.

CO7: To create conditional structures.

CO8: To store data in arrays.

CO9: To use PHP built-in functions and creating custom functions.

CA601-T - Software Testing and Quality Assurance:

CO1: Students will be able to identify benefits and the needs to enforce software quality.

CO2: Students will be able to differentiate between quality control, quality management and quality assurance.

CO3: Students will be able to discuss different software quality factors models.

CO4: Students learn systematic approach to the development, operation, maintenance, and retirement of software.

CO5: To understand methods and tools of testing and maintenance of software's.

CO6: Student can understand the use of resources to develop software, reduce cost of software and quality maintenance of software.

CA602-T - Computer Graphics-II

CO1: Student will understand three dimensional (3-D) basic concepts.

CO2: Students will be able to perform different operations on an object such as 3D-rotation, scaling and translation.

CO3: Students can clip objects using different methods/algorithms.

CO4: To understand curves and fractals concept.

CO5: To enable students to identify and describe different color models for defining an object.

CO6: To understand the concept of animation and implement in real time applications.

CA603-T- Java Server Pages (JSP)

CO1: Students will understand Java server pages by its life cycle.

CO2: Students can learn different scripting tags.

CO3: Students can understand different tags helpful to the server pages such as directive tags, action tags and also depth knowledge of Java Beans.

CO4: To handle database access to JSP page.

CO5: To understand JSTL, Core and XML tag library.

Code: CA604-T - Data Mining:

CO1: To build basic terminology.

CO2: To display a comprehensive understanding of different data mining tasks and the algorithms most appropriate for addressing them.

CO3: To evaluate models/algorithms with respect to accuracy.

CO4: To demonstrate capacity to perform a self-directed piece of practical work that requires the application of data mining techniques.

CO5: To analyze critically the results of data mining exercise.

CO6: To develop hypotheses based on the analysis of results and test them.

CO7: To understand a data mining solution to a practical problem.

CA606-T - Cloud computing:

CO1: Students can learn cloud computing fundamentals with cloud services.

CO2: Students can learn different cloud computing technologies and their applications.

CO3: Students can understand key enabling technologies for virtual private clouds and their applications.

CO4: Students can understand different role of networks in cloud computing.

CO5: Students can learn architecture of cloud and data-intensive technologies along with their characteristics and system architecture for cloud computing.

Course Code: CA607-T - Advanced Programming with PHP:

CO1: To maintain state using cookies, session variables, hidden form fields and query strings.

CO2: To use PHP to manipulate files.

CO3: To identify and handle errors that can occur while programming with PHP.

CO4: To introduce to OOP (Object Oriented Programming) in PHP.

CO5: To understand use of an object-oriented API to access SQL to SELECT, INSERT, UPDATE and DELETE data from tables.

CO6: To use phpMyAdmin utility to administer the MySQL database.

CO7: To use OOP in PHP to define and use classes.

Code: CA609-P - Pr. Based on PHP & JSP (LAB)

CO1: To identify and handle the types of errors that can occur while programming with PHP.

CO2: To introduce learners to OOP (Object Oriented Programming) in PHP.

CO3: To use an object-oriented API to access SQL to SELECT, INSERT, UPDATE and DELETE data from tables.

CO4: To use php MyAdmin utility to administer the MySQL database.

CO5: To use OOP in PHP to define and use classes.

CO6: To choose an engineering approach to solve problems, starting from the acquired knowledge of programming and knowledge of operating systems.

CO7: To implement programming using various action tags in JSP.

CO8: To understand scripting tag manipulations.

CO9: To learn JSP & Java beans.

CO10: To study session API in JSP.

CO11: To understand database access to JSP page.

CO12: To study SQL tagged library and function tag library in JSP.

CA610P - Major Project:

CO1: To formulate a real world problem and develop its requirements.

CO2: To develop a design solution for a set of requirements.

CO3: To test and validate conformance of the developed prototype against the original requirements of a problem.

CO4: To work as a responsible member and a leader of a team in developing software solutions.

CO5: To express technical, behavioral ideas and thought in oral settings.

CO6: To participate in and possibly moderate, discussions that lead to make decisions.

CO8: To express technical ideas, strategies and methodologies in written form.

CO9: To prepare and conduct oral presentations.

CO10: To learn new tools, algorithms, and/or techniques those contributes to software solution of the project.

CO11: To generate alternative solutions, compare them and select the optimum one.

COs: B.Sc. (Computer Science)

B.Sc. [CS] Semester-I CS101-T -Computer Fundamentals:

CO1: To introduce learners to computers.

CO2: To write algorithms and draw flowcharts which are the first step towards the computer programming.

CO3: Students will understand history of computers.

CO4: Students will learn different programming languages.

CO5: Students will be introduced with memory and storage devices.

CO6: Students will understand input and output devices.

CS102-T - Digital Electronics:

CO1: Students will understand computer number system, arithmetic operations, Boolean algebra and logic gates.

CO2: Students will learn K-maps and combinational and arithmetic logic circuits.

CO3: Students will understand flip-flops, counters, registers, their types and their functions.

CS103-T - Microprocessor:

Learners will be able …..

CO1: To understand microprocessors, microcomputers and 8086 hardware specifications.

CO2: To learn the working of 8086 microprocessor.

CO3: To learn addressing modes of 8086.

CO4: To learn instruction set and write programs on 8086 kit.

CS104-T - 'C' Programming - I:

CO1: Students will be introduced to C-programming language.

CO2: Students can use C-character set, basic elements and operators used in C-programming.

CO3: Students will learn the data types of C and input/output statements.

CO4: Students will be able to write the programs using C-language.

CO5: Students can use programs and array.

CS105-T - Communication Skill –1:

CO1: To enhance communication skills of students.

CO2: Students can apply types and methods of communication.

CO3: Students will able to communicate in English properly.

CO4: Students will learn English grammar and vocabulary.

CO5: Students will be able to express speeches and presentations in English.

CO6: To acquaint practice to read, write and speak in English.

CS106-T - Mathematical Foundation:

CO1: Students will learn set theory useful for higher studies.

CO2: Students will learn graph theory.

CO3: Students will understand different binary relations and functions.

CO4: Students will learn Boolean algebra.

CS107-P - Practical based on Office Suite:

CO1: To use basic computer operations.

CO2: To use internet.

CO3: To demonstrate the mechanics and uses of Word tables to organize and present data.

CO4: To demonstrate working knowledge of Word's themes and clip art.

CO5: To demonstrate Word's advanced formatting techniques and presentation of styles.

CO6: To demonstrate accepted business style formatting conventions.

CO7: To create documents using Microsoft word in writing applications, letters and office use.

CO8: To create and design a spreadsheet for general office use.

CO9: To enable students for delivering presentations using computer.

CO10: To create visual effects.

CS108-P - Practical based on Digital electronics:

CO1: To express use of analog signals to represent digital values in logic families, including characterization of the noise margins.

CO2: To create appropriate truth table from a description of a combinational logic function.

CO3: To create a gate-level implementation of a combinational logic function described by a truth table using and/or/in gates.

CO4: To evaluate combinational and sequential logic designs using metrics.

CS109-P - Practical based on Micro Processor - I:

A student will be able to …..

CO1: Understand Intel-8086 microprocessor architecture and real mode memory addressing.

CO2: Apply Intel microprocessor addressing modes.

CO3: Assemble language programming and debugging.

CO4: Perform arithmetic calculations using 8086 microprocessor kit.

CO5: Transfer and exchange data among memory units.

CS110-P- Practical based on 'C' Programming:

CO1: To understand the fundamentals of C programming.

CO2: To choose loops and decision making statements for solving problems.

CO3: To implement different operations on arrays.

CO4: To understand the basic mathematical calculations.

B.Sc. [CS] Semester-II CS201-T- Data Structure:

CO1: Students will understand basics of data structure.

CO2: Students will learn the use of arrays in data structure.

CO3: Students will understand working of linked list, stacks and queues.

CS202-T- Operating System:

CO1: Students will learn the working of operating system.

CO2: Students can processes and manage operating systems.

CO3: Students can understand storage and device management.

CO4: Students can handle file structure managed by operating system.

CS203-T-Micro Processor - II:

CO1: Students will learn the logic and control instructions of 8086.

CO2: Students will be familiarized to modular programming, assembler, linker and macros.

CO3: Students will understand interrupts, their types, DMA and DMA control I/O.

CS204-T- 'C' Programming - II

CO1: Students can write user defined functions.

CO2: Students will be able to use structures and union within C-programs.

CO3: Students will able to use pointers within program to access the computer memory location directly.

CO4: Students will learn to use preprocessor directives and miscellaneous features.

CO5: Students will be able to work on files using C-programs.

CS205-T- Communication Skill-II

CO1: Apply communication skills to write letters, notices, minutes, manual, leaflet, complaints & suggestion and job application.

CO2: Write reports.

CO3: Discuss in groups and enhance communication skills.

CO4: Write CV for interview.

CO5: Prepare for interview.

CS206-T - Numerical Computation Methods:

CO1: Students will understand types of errors in mathematics.

CO2: Students can understand the matrix and determinants.

CO3: Students can understand the roots of linear and nonlinear equations.

CO4: To learn interpolation and regression methods.

CS207-P-Practical based on Data Structure:

CO1: To understand the concept of dynamic memory management, data types, algorithms and big O notation.

CO2: to understand the basic data structures.

CO3: To describe the hash function, concepts of collision & resolution methods.

CO4: To solve problem involving graphs, trees and heaps.

CO5: To apply algorithm for solving problems.

CS208-P-Practical based on Micro Processor - II:

CO1: Students will learn to implement arithmetic operations on 8-bit numbers.

CO2: Students will learn to write 8086 program to find smallest/largest number.

CO3: Students will learn to write 8086 program for sum of array elements, reverse of array elements.

CO4: Students can design programs over 8086.

CS209-P- Practical based on C Programming-II:

After studying the course, a student will be able to ….

CO1: Implement programs with pointers, arrays, perform pointer arithmetic, and use the pre-processor.

CO2: Write programs that perform operations using derived data types.

CO3: Use pointers and user defined data types.

CO4: Use functions used in C-language.

CS210-P- Practical based on Numerical Computational Method:

A student will be able to….

CO1: Identify mathematical problems and reformulate them with appropriate numerical treatment.

CO2: Choose appropriate numerical method for treatment of a given problem.

CO3: Explain choice of method by accounting for advantages and limitations.

CO4: Choose an algorithm that implies efficient calculations and implement in programming language, suited for calculations.

CO5: Estimate the reliability of results.

CO6: Use functions from the programming language library for efficient calculations and visualization.

CO7: Apply computer science for the solution of practical problems.

B.Sc.[CS] Semester-III Advance Data Structure (CS301-T)

CO1: Students can use graph theory.

CO2: Students can understand sorting techniques.

CO3: Students can apply searching techniques.

Unix Operating System (CS302-T)

CO1: Students will be able to understand UNIX operating system.

CO2: Students will learn the basic commands to work on UNIX operating system.

CO3: Students can create and use files on UNIX operating system.

CO4: Students can learn shell script in programming on UNIX.

110 PC Maintenance (CS303-T)

CO1: Students will learn computer hardware and its maintenance.

CO2: Students will learn s/w installations for PC and its settings.

CO3: Students will understand networking, settings and antivirus installation.

CO4: Students will understand laptop and its components.

Programming in CPP (CS304-T)

CO1: To acquire basic object oriented concepts in oriented programming for software development.

CO2: To learn history, structure of C^{++} language and functions in C^{++}.

CO3: To learn use of class, object and friend function.

CO4: To apply programming in C^{++} to solve the real world problem using class and objects.

CO5: To learn constructors, destructors and operator overloading.

Database management System (CS305-T)

CO1: To understand database, architecture, features, purpose and advantages of DBMS.

CO2: To understand components of a DBMS: Users, facilities & structure.

CO3: To learn data modeling & design.

CO4: To learn entity-relationship data model.

CO5: To understand the basics of relational model, normalization, relational CO algebra.

CO6: To introduce to oracle s/w.

Statistical methods (CS306-T)

CO1: To enable learners for competitive examinations.

CO2: To apply statistics in real life.

CO3: To understand and calculate types of averages and variations.

CO4: To apply discrete and continuous probability distributions in business problems.

CO5: To organize, manage, and present data.

CO6: To exercise small projects that incorporate data presentation.

CO7: To write reports on the results of statistical analysis, summarize and conclude using non-technical language.

Practical based on data structure using CPP. (CS307-P)

CO1: To apply sorting techniques using C-language.

CO2: To apply searching techniques using C-language.

Practical based on DBMS (CS307-P)

CO1: To explain the features of database management systems.

CO2: To draw a scheme for their database.

CO3: To design conceptual models of a database using ER modeling.

CO4: To understand basics of relational model, normalization, relational algebra.

CO5: To introduce to oracle s/w.

Practical based on PC Maintenance (CS308-P)

CO1: To understand computer hardware and motherboard.

CO2: To learn connecting of input, output and storage devices.

CO3: To understand installation of software on PC.

CO4: To learn formatting of hard disk and creating partitions on HD.

CO5: To study installation of device drivers and antivirus.

Practical based on UNIX (CS308-P)

CO1: To understand working with UNIX Operating System (OS).

CO2: To execute commands of UNIX OS.

CO3: To create and access files on UNIX OS.

CO4: To write and execute shell script for UNIX OS to get the desired result.

B.Sc. [CS] Semester-IV Software Engineering (CS401-T)

CO1: To understand software development process.

CO2: To learn different types of s/w.

CO3: To study different models of s/w.

Fedora (CS402-T)

CO1: Introduction to fedora operating system.

CO2: Understanding of basic commands of Linux and fedora installation.

CO3: Understanding of software package administration, user and group administration.

CO4: Learning file system and file permissions.

Basics of Networking (CS403-T)

CO1: Learn networks, topologies and applications of networks.

CO2: Learn types of transmission media used in data communication.

CO3: Introduction to mobile telephone system, generations and its working.

Core Java (CS404-T)

CO1: To implement object oriented programming concepts.

CO2: To study inheritance and interfaces.

CO3: To study packages.

CO4: To create package in java.

CO5: To implement exception handling in Java.

Implement Multithreading: Adv. DBMS (CS405-T)

Student will be able to ….

CO1: Deal with database system using SQL to manipulate data.

CO2: Extract information on physical storage of data.

CO3: Architect database system.

CO4: Learn transaction processing and concurrency control.

Web Fundamental (CS406-T)

Students will be able …..

CO1: To understand HTML, XHTML, HTML5 and its elements.

CO2: To create static web pages.

CO3: To code program in web page.

CO4: To create dynamic web pages.

CO5: To study CSS3 for designing web page.

CO6: To design web pages using cascaded style sheets.

Practical based on Java in fedora OS (CS407-P):

CO1: To understand structure and model of Java programming language.

CO2: To use Java programming language.

CO3: To evaluate and analyze user requirements for software functionality.

CO4: To propose the use of certain technologies by implementing in Java programming language to solve problems.

CO5: To apply engineering approach for solving problems.

CO6: To create user defined packages and handle the errors.

Practical based on Web Fundamentals (CS407-P)

CO1: To understand higher level of HTML, CSS using HTML5 and CSS3.

CO2: To validate web pages/ web sites as per requirement.

CO3: To develop HTML forms and different attributes.

CO4: To work with drag and drop event handling.

CO5: To use JavaScript in HTML.

Practical based on Adv. DBMS and N/W (CS408-P)

CO1: To define database system concepts and apply normalization to the database.

CO2: To explain basic processing and optimization techniques for high level query.

CO3: To describe transaction processing concepts and use different concurrency control techniques.

CO4: To discuss databases such as object oriented and distributed databases.

CO5: To identify database failures and techniques.

CO6: To discuss advanced database technologies and products used in enterprise.

Practical based on Mini Project (CS408-P)

CO1: To formulate a real world problem and develop its requirements.

CO2: To develop a design solution for a set of requirements.

CO3: To test and validate conformance of developed prototype against the requirements of the problem.

CO4: To work as a responsible member and possibly a leader of a team in developing software solutions.

CO5: To express technical and behavioral ideas and thoughts in oral settings.

CO6: To prepare and conduct oral presentations.

B.Sc. [CS] Semester-V Software Cost Estimation (CS501-T)

CO1: To learn software planning process, software scope and feasibility, types of resources, project estimation.

CO2: To study documentation techniques.

CO3: To study estimation of models.

Basic of Android O. S. (CS502-T)

CO1: To study environmental setup for android development.

CO2: To understand application components used in android development.

CO3: To learn the basic components of an android application.

CO4: To study resource organization, filters and user interface controls.

CO5: To understand event handling in android.

CO6: To describe the basics of graphics and multimedia support in android.

CO7: To demonstrate basic skills using an integrated development environment (android studio) and android software development kit (sdk) for implementing android applications.

CO8: To demonstrate a simple application of the understanding of basic concepts of android.

Core Java-II (CS503-T):

CO1: To understand input/output system in java.

CO2: To understand utilities in java language.

CO3: To provide an overview of database access and details of managing information using the JDBC API.

CO4: To learn use of Java applets to create interactive web programs: Fonts, color, graphics, and animation.

CO5: To understand the use of Java applets to create interactive web programs by sending and receiving parameters in an applet.

Basic of Computer Graphics (CS504-T)

CO1: To understand basic concepts of computer graphics.

CO2: To create graphics using C-programming.

CO3: To perform 2D transformation.

CO4: To create algorithms.

CO5: To apply character generation techniques.

Beginners Programme with PHP (CS505-T)

CO1: Introduction to PHP.

CO2: To understand working of server-side programming on the web.

CO3: To use PHP basic syntax for variable, data types, operators and expressions and constant.

CO4: To create conditional structures.

CO5: To store data in arrays.

CO6: To use PHP built-in functions and create custom functions.

CO7: To use class and objects in PHP.

Advanced Networking (CS508-T)

CO1: To understand OSI reference model.

CO2: To study data link layer, data link controls and protocols.

CO3: To understand network layer and its protocols.

CO4: To study transport layer and application layer.

Pr. Based on Adv. Java (CS509P -A)

CO1: To learn input/output stream used in java.

CO2: To learn utilities in java language.

CO3: To provide an overview of database access and details for managing information using the JDBC API.

Practical Based on Computer Graphics (CS509P -B)

CO1: Students can understand graphical functions of C-Language.

CO2: Students can perform 2D transformation, translation, scaling, and rotation of 2D object using C-Language.

CO3: Students can implement algorithms to draw line and circle.

Practical Based on Android O.S. (CS510P -A)

CO1: To appreciate mobility landscape.

CO2: To design and develop mobile apps, using android as development platform, with key focus on user experience design.

CO3: To understand native data handling and background tasks and notifications.

CO4: To appreciate nuances such as native hardware play, location awareness, graphics, and multimedia.

CO5: To perform testing, signing, packaging and distribution of mobile apps.

Practical Based on PHP (CS510P -B)

CO1: PHP basic syntax for variable types and calculations.

CO2: To create conditional structures.

CO3: To store data in arrays.

CO4: To use PHP built-in functions and create custom functions.

B.Sc. [CS] Semester-VI Software Quality & Testing (CS601-T)

CO1: To understand software quality concepts.

CO2: To understand quality assurance.

CO3: To understand software testing strategies, verifications and validations.

CO4: To validate conventional applications.

CO5: To test web applications.

Android Application Development (CS602-T)

CO1: To familiarize learners with android development tools.

CO2: To apply advanced features of Android SDK.

CO3: To develop android apps with different tools.

CO4: To use location services APIs to get information about device location, receive periodic location updates, and turn geographic coordinates into physical addresses.

CO5: To integrate Google maps into apps and use features such as location markers, map styling, street view, and location tracking.

CO6: To learn messaging services used by android apps.

CO7: To learn data storage, retrieval, and sharing.

CO8: To use Bluetooth, Wi-Fi in android applications.

Theory of Computation (CS603-T)

CO1: To study sets, relations, functions, graphs, trees and mathematical inductions.

CO2: To study regular expressions.

CO3: To learn finite automate, NFA and DFA.

CO4: To learn formal languages, classification of languages, their relation and automaton.

CO5: To understand programming languages.

Advanced Computer Graphics (CS604-T)

CO1: To understand 3D transformations.

CO2: To create curves and fractals.

CO3: To understand basics of color models.

CO4: To create animations.

Advanced Programming with PHP (CS605-T)

CO1: To handle HTML forms in PHP.

CO2: To maintain state using cookies, session variables, hidden form fields and query strings.

CO3: To use PHP to manipulate files.

CO4: To use database in PHP.

CO5: to use an object-oriented API to access SQL to SELECT, INSERT, UPDATE and DELETE data from tables.

CO6: To use MySQL functions.

Ethics and Cyber Law (CS608-T)

CO1: To understand the of scope of cyber laws, cyber jurisprudence and digital contracts.

CO2: To identify intellectual property right issues in the cyberspace and design strategies to protect intellectual property.

CO3: To describe laws governing cyberspace and analyze the role of internet governance in framing policies for internet security.

CO4: To understand cybercrimes and analyze legal frameworks of different countries to deal with these cybercrimes.

CO5: To explain the importance of jurisdictional boundaries and identify the measures to overcome cross jurisdictional cybercrimes.

CO6: To illustrate the importance of ethics in legal profession and determine appropriate ethical and legal behavior according to legal frameworks.

Study of Information Technology Act 2000 Cyber Law Practical Based on Android Development (CS609 P -A)

CO1: To understand advanced features of Android SDK.

CO2: To familiarize with android development tools.

CO3: To develop android apps.

CO4: To use location services of APIs to get information about device location, receive periodic location updates, and turn geographic coordinates into physical addresses.

CO5: To integrate Google Maps into apps and use features such as location markers, map styling, Street View, and location tracking.

CO6: To understand messaging services used by android apps.

Practical Based on PHP (CS609 P -B)

CO1: To identify and handle types of errors while working with PHP.

CO2: To introduce Object Oriented Programming.

CO3: To understand the use of object-oriented API, SELECT, INSERT, UPDATE and DELETE data from tables.

CO4: To use MySQL database.

CO5: To use OOP in PHP to define and use classes.

CO6: To choose an engineering approach to solve problems, starting from the acquired knowledge of programming and operating systems.

Major Project (CS610P)

CO1: To formulate a real world problem and develop its requirements.

CO2: To develop a design solution for a set of requirements.

CO3: To test and validate the conformance of the developed prototype against the original requirements of a problem.

CO4: To work as a responsible member and a leader of a team in developing software solutions.

CO5: To express technical and behavioral ideas and thoughts in oral settings.

CO6: To participate in and possibly moderate, discussions that lead to making decisions.

CO7: To express technical ideas, strategies and methodologies in written form.

CO8: To prepare and conduct oral presentations.

CO9: To develop software.

COs: Information Technology

B.Sc. (I. T.) Computer Fundamental (Course code: IT101-T)

CO1: To familiarize with computers.

CO2: To familiarize with the basics of operating system and business communication tools.

CO3: To identify parts of a computer system.

CO4: To explain functioning of computer components.

CO5: To solve problems using computers.

CO6: To design algorithmic solutions for a given problem.

Digital Electronics (Course code: IT102-T)

CO1: To familiarize with concepts of digital electronics.

CO2: To learn number systems and their representations.

CO3: To understand basic logic gates, Boolean algebra and K-maps.

CO4: To study arithmetic circuits, combinational circuits and sequential circuits.

CO5: To study comparative aspects of logic families.

8086 Microprocessor (Course code: IT103-T)

CO1: To understand basic architecture of 16 BIT microprocessors.

CO2: To understand interfacing of 16 bit microprocessor with memory and peripheral chips involving system design.

CO3: To understand techniques for faster execution of instructions and improve speed of operation and performance of microprocessors.

CO4: To understand microprocessor instruction sets and assembly language programming.

CO5: To write programs to run on 8086 microprocessor based systems.

Programming in C –I (Course code: IT104-T)

CO1: To understand programming languages.

CO2: To adopt problem solving techniques.

CO3: To write programs in C and to solve the problems.

CO4: To read, understand and trace the execution of programs in C language.

CO5: To write the C code for a given algorithm.

CO6: To implement programs with pointers and arrays, perform pointer arithmetic, and use the pre-processor.

CO7: To write programs that performs operations using derived data types.

Communication Skill (Course code: IT106-T)

CO1: To demonstrate preparation and research skills for oral presentations.

CO2: To develop proper listening skills.

CO3: To articulate and enunciate words and sentences clearly and efficiently.

CO4: To show confidence and clarity in public speaking projects.

CO5: To demonstrate ability to gather information and apply it to persuade or articulate one's own point of view.

Written Communication

CO1: To understand the rules of spelling and grammar.

CO2: To read, analyze text and be able to summarize ideas in writing.

CO3: To organize thoughts in a manner that emphasizes flow and paragraph development.

CO4: To learn proper footnoting and bibliography skills.

CO5: To understand writing techniques and styles based on the communication medium.

Mathematical Foundation (Course code: IT106-T)

CO1: To distinguish between statement logic and predicate logic.

CO2: To visualize data numerically and/or graphically.

CO3: To evaluate mathematical principles and logic design.

CO4: To apply induction and other proof techniques towards solving recurrences and related problems in elementary algebra, design elementary deterministic and randomized algorithms to solve computational problems.

CO5: To illustrate basic terminology of functions, relations, sets and demonstrate knowledge of their associated operations in mathematical modeling.

CO6: To demonstrate effectively mathematical ideas/results verbally or in writing and utilize the knowledge of computing and mathematics appropriate to the discipline.

CO7: To understand the functions, concepts and distinguish different types of functions.

CO8: To develop ability to solve the recurrence relations.

CO9: To identify and describe types of relations.

Office Suite Practical (LAB) (Course code: IT107P)

A student will be able to …..

CO1: Demonstrate the mechanics and uses of word tables to organize and present data.

CO2: Demonstrate working knowledge of using Word's themes and clip art to create a variety of visual effects.

CO3: Demonstrate working knowledge of Word's advanced formatting techniques and presentation styles.

CO4: Demonstrate applicable knowledge and uses of accepted business style formatting conventions.

CO5: To create and design a spreadsheet for general office use.

CO6: To demonstrate the basic mechanics of creating a Power Point Presentation.

Digital Electronics Practical (LAB) Course code:

CO1: To understand use of analog signals for presenting digital values in different logic families, including characterization of the noise margins.

CO2: To create appropriate truth table from a description of a combinational logic function.

CO3: To create a gate-level implementation of a combinational logic function described by a truth table using and/or/inv gates.

CO4: To evaluate combinational and sequential logic designs using metrics.

Microprocessor-I (8086) Practical (LAB) Course code: IT109P

A student will be able to understand ….

CO1: Intel 8086 microprocessor architecture and real mode memory addressing.

CO2: Intel microprocessor addressing modes.

CO3: Assembly language programming and debugging.

CO4: Arithmetic calculations using 8086 microprocessor kit.

CO5: Transfer of data and exchange of data between various memory units.

C Programming-I Practical (LAB) Course code: IT109P

A student will be able to ……

CO1: To understand the fundamentals of C-programming.

CO2: To choose the loops and decision making statements for solving problems.

CO3: To apply operations on arrays.

CO4: To understand the basic mathematical calculations.

B.Sc. (I.T.)-II nd Semester Data Structures: Course code: IT201-T

CO1: Students can choose appropriate data structure as applied to specified problem definition.

CO2: Student can handle operations such as searching, insertion, deletion, traversing mechanism etc.

CO3: Students will be able to apply concepts.

CO4: Students will be able to use linear and non-linear data structures such as stacks, queues, linked list etc.

Operating System: Course code: IT202-T

CO1: To understand master functions, structures and history of operating systems.

CO2: To learn design issues associated with operating systems.

CO3: To understand process management concepts including scheduling, synchronization, and deadlocks.

CO4: To familiarize learners with multithreading.

CO5: To learn master concepts of memory management including virtual memory.

CO6: To study master system resources sharing among the users.

CO7: To learn issues related to file system interface and implementation, disk management.

CO8: To familiarize students with protection and security mechanisms.

CO9: To familiarize students with operating systems.

I.T. Tools & Web Designing –I: Course code: IT203-T

CO1: To learn basics of internet and web designing.

CO2: To understand architecture of browser, server, web page, web sites & clients.

CO3: To understand internet domains, protocols and browser and server communication.

CO4: To understand HTML and DTML language for web page development.

CO5: To understand concepts of internet programming using JavaScript.

C-Programming-II: Course code: IT204-T

CO1: To create user defined functions for specific task in C-language.

CO2: To understand the functions.

CO3: To understand use of user defined data types such as structures & unions.

CO4: To deal with memory using pointers.

CO5: To understand library functions and storage classes in C-language.

CO6: To understand preprocessor directives and operators in C-language.

CO7: To deal with files stored on computer memory using file handling.

Communication Skill –II: Course code: IT205-T

CO1: To enhance research skills for oral presentations.

CO2: To develop proper listening skills.

CO3: To articulate and enunciate words and sentences clearly and efficiently.

CO4: To enhance confidence and clarity in public speaking projects.

CO5: To demonstrate ability to gather information and apply.

Goal Two: Written Communication

CO1: To understand grammar.

CO2: To read, analyze text and enable leaners to summarize ideas in writing.

CO3: To organize thoughts with emphasis on paragraph development.

CO4: To learn proper footnoting and bibliography skills.

CO5: To understand writing techniques and styles based on the communication medium.

CO6: To develop group discussion and communication skill.

CO7: To develop listening comprehension, reading comprehension and vocabulary.

Numerical Methods: Course code: IT206-T

CO1: To demonstrate common numerical methods.

CO2: To apply numerical methods for obtaining approximate solutions to mathematical problems.

CO3: To study numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, solution of linear and nonlinear equations, and the solution of differential equations.

CO4: To analyze and evaluate the accuracy of common numerical methods.

Data Structure (LAB) (Course code: IT207P)

A student will be able to ….

CO1: Understand the concept of dynamic memory management, data types, algorithms, big O notation.

CO2: Understand basic data structures such as arrays, linked lists, stacks and queues.

CO3: Describe the hash function and concepts of collision and its resolution methods.

CO4: Solve problem involving graphs, trees and heaps.

CO5: Apply algorithm for solving problems like sorting, searching, insertion and deletion of data.

I.T. Tools & Web Designing – I (LAB) (Course code: IT208P)

A student will be able to ….

CO1: Explain the history of the internet and related internet concepts that are vital in understanding web development.

CO2: Discuss insights of internet programming and implement complete application over the web.

CO3: Demonstrate the importance of HTML tags for designing static pages and separate design from content using cascading style sheet.

C Programming - II (LAB) (Course code: IT209P)

A student will be able to ….

CO1: Implement programs with pointers, arrays, arithmetic, and use the pre-processor.

CO2: Write programs that perform operations using derived data types.

CO3: Use pointers and user defined data types.

CO4: Use functions in C-language.

Numerical Method (LAB) (Course code: IT210P)

A student will be able to….

CO1: Identify different mathematical problems and reformulate them in a way that is appropriate for numerical treatment.

CO2: Choose appropriate numerical method for treatment of the given problem.

CO3: Explain choice of method by accounting for advantages and limitations.

CO4: Choose an algorithm that implies efficient calculations and implement it in a programming language, suited for calculations.

CO5: Estimate the reliability of the results.

CO6: Use functions from the programming language library for efficient calculations and visualization.

CO7: Apply computer science for the solution of practical problems.

Database Management System (Course Code: IT301-T):

CO1: To understand the basic concepts of database management system, architecture, features, purpose and advantage of DBMS.

CO2: To learning about components of a DBMS: Users, facilities & structure.

CO3: To understand Data Modeling & Design.

CO4: To understand entity-relationship data model.

CO5: To understand basics of relational model, normalization and relational algebra.

CO6: To understand the basics of oracle s/w.

Android - I (Course Code: IT302-T):

CO1: To understand environmental setup for android development.

CO2: To study application components used in android development.

CO3: To describe basic components of an Android application.

CO4: To define lifecycle methods of android application components.

CO5: To describe the basics of event handling in android.

CO6: To describe the basics of graphics and multimedia support in android.

CO7: To demonstrate basic skills of using an integrated development environment (android studio) and android software development kit for implementing Android applications.

CO8: To demonstrate simple application in the understanding of the basic concepts of android.

I.T. Tools & Web Designing-II (Course Code: IT303-T):

After completing the course….

CO1: Student will understand use of higher level of HTML, CSS with the help of HTML5 and CSS3.

CO2: Student can validate web pages/ web sites as per requirement.

CO3: Student can develop web applications using HTML and different attributes.

CO4: Students can work with drag and drop event handling.

CO5: Students can add effects using different functions for web page using J-Query.

Programming in CPP (Course Code: IT304-T):

CO1: To acquire an understanding of basic object oriented concepts and the issues involved in effective class design.

CO2: To write C^{++} programs that use object oriented concepts such as information hiding, constructors, destructors, inheritance etc.

Personality Development (Course Code: IT305-T):

CO1: To develop, exhibit and accurate sense of self.

CO2: To develop and nurture a deep understanding of personal motivation.

CO3: To develop an understanding of practice personal and professional responsibility.

CO4: To enhance confidence.

CO5: To identify, understand, and apply contemporary theories of leadership to a wide range of situations and interactions.

CO6: To develop and articulate a personal philosophy of leadership.

CO7: To understand concepts of democratic leadership and processes.

Statistical Method Course Code: IT306-T):

CO1: To prepare for competitive examinations.

CO2: To know application of statistics in real life.

CO3: To understand and calculate averages and variations.

CO4: To apply discrete and continuous probability distributions to various business problems.

CO5: To organize, manage and present data.

CO6: To develop and handle small projects incorporating data presentation.

CO7: To demonstrate ability to write reports of the results of statistical analyses giving summaries and conclusions using nontechnical language.

Programming in C^{++} & DBMS (LAB) (Course Code: IT307P):

CO1: To familiarize learners with C^{++} functions and the concepts related to good modular design.

CO2: To familiarize learners with one-dimensional and two-dimensional arrays.

CO3: To familiarize learners with C^{++} structures.

CO4: To familiarize with using pointers and reference parameters.

CO5: To familiarize with text file input/output.

CO6: To understand C^{++} classes.

CO7: To explain the features of database management systems.

CO8: To design conceptual models of a database using ER modeling.

Android-T & I.T. Tools & Web Design-II (LAB) (Course Code: IT308P):

CO1: Students will be able to appreciate mobility landscape.

CO2: Students will be able to design and develop mobile apps, using android as development platform, with key focus on user experience design.

CO3: Students will be able to deal with native data handling and background tasks and notifications.

CO4: Students will be able to appreciate nuances such as native hardware play, location awareness, graphics, and multimedia.

CO6: Students can use HTML 5 forms, validations, API's and different attributes.

CO7: Students can use event handling with drag and drop.

CO8: Students can use J Query to add effects too web page.

Advance Database Management System (Course Code: IT401-T):

CO1: To deal with database system using SQL.

CO2: To understand physical storage of data.

CO3: To understand architecture of database system.

CO4: To understand transaction processing and concurrency control.

Advanced Android Application Development (Course Code: IT402-T):

Students will be able to understand and apply….

CO1: Advanced features of android SDK.

CO2: Android Development Tools.

CO3: Android apps with different tools.

CO4: Use of Location Services APIs.

CO5: Use of integrated Google maps into apps.

CO6: Messaging services in android apps.

I.T. Tools & Web Designing- III (Course Code: IT403-T):

CO1: Understanding of programming for web development.

CO2: Use of static and dynamic web pages and databases for web sites.

CO3: Learning about VB scripts language.

CO4: Learning about HTML forms and controls.

CO5: Use cookies and database into web applications.

Core Java-I (Course Code: IT404-T):

CO1: To implement object oriented programming concepts.

CO2: To use and create packages and interfaces in a Java program.

CO3: To use graphical user interface in Java programs.

CO4: To create applets.

CO5: To implement exception handling in Java.

CO6: To implement multithreading.

CO7: To use input/output streams.

CO8: To handle security implementations in Java.

Aptitude and Logical Reasoning Course Code: IT405-T

CO1: To enable leaners compatible for competitive examinations.

CO2: To evaluate various real life situations by resorting to analysis of key factors and issues.

CO3: To read in between the lines and understand various language structures.

CO4: To demonstrate principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions.

Software Project Management (Course Code: IT406-T):

CO1: To manage the selection and initiation of individual projects and portfolios of projects in the enterprise.

CO2: To conduct project planning activities those accurately forecast project costs, timelines, and quality.

CO3: To demonstrate effective project execution and control techniques that result in successful projects.

CO4: To conduct project closure activities and obtain formal project acceptance.

CO5: To demonstrate a strong working knowledge of ethics and professional responsibility.

CO6: To demonstrate effective organizational leadership and change skills for managing projects, project teams, and stakeholders.

CO7: To implement processes for successful resource, communication, risk and change management.

Programming in Java &Adv. DBMS using SQL (LAB) (Course Code: IT407-T):

A student will able to ….

CO1: Understand the structure and model of Java programming language.

CO2: Use Java programming language for various programming technologies.

CO3: Evaluate user requirements for software functionality required to decide whether the Java programming language can meet user requirements.

CO4: Propose the use of certain technologies by implementing them in the Java programming language to solve the given problem.

CO5: Choose an engineering approach for solving problems, starting from the acquired knowledge of programming and knowledge of operating systems.

CO6: Define database system concepts and apply normalization to the database.

CO7: Explain the basic processing and optimization techniques for high level query.

CO8: Describe different transaction processing concepts and use different concurrency control techniques.

CO9: Discuss different types of databases such as object oriented and distributed databases.

CO10: Identify different types of database failures and techniques to recover from such failures.

CO11: Discuss advanced database technologies and products used in enterprise.

128 Adv. Android & Mini project (LAB) (Course Code: IT408-T):

A student will able to …..

CO1: Understand advanced features of android SDK.

CO2: Familiarize with android development tools.

CO3: Develop android apps with different tools.

CO4: Use location services APIs to get information about device location, receive periodic location updates, and turn geographic coordinates into physical addresses.

CO5: Learn integrated use of Google Maps into your apps and use features like location markers, map styling, Street View, and location tracking.

CO6: Learn about messaging services used by android apps.

CO7: Formulate a real world problem and develop its requirements.

CO8: Develop a design solution for a set of requirements.

CO9: Test and validate conformance of developed prototype against the original requirements.

CO10: Work as a responsible member and as a leader of a team in developing software solutions.

CO11: Express technical and behavioral ideas and thoughts in oral settings.

CO12: Prepare and conduct oral presentations.

CO13: Learn new tools, algorithms, and/or techniques that contribute to the software solution of the project.

CO14: Generate alternative solutions, compare them and select the optimum one.

Software Project Management II (Course Code: IT501-T):

CO1: Recognize, trace and resolve IT related crises using project management software.

CO2: Identify the impact of IT projects on the performance of the organizations.

CO3: Manage the phases and infrastructure of IT projects.

CO4: Develop strategies to calculate risk factors involved in IT projects.

CO5: Use project management software to control the design, implementation, closure, and evaluation of IT projects.

CO6: Estimate, plan, calculate, and adjust project variables.

Data Communication & Networks (Course Code: IT502-T):

CO1: Understand networks, topologies and application of networks.

CO2: Understand types of addresses and data communication.

CO3: Understand networking models, protocols and their functions.

CO4: Understand networking hardware and tools.

CO5: Understand wired and wireless networks, their types and functionality of layer.

CO6: Understand importance of network security and cryptography.

Beginners Programming with PHP (Course Code: IT503-T):

CO1: Understand working of server-side programming on web.

CO2: Understand PHP basic syntax for variable types and calculations.

CO3: Creating conditional structures.

CO4: Storing data in arrays.

CO5: Using PHP built-in functions and creating custom functions.

Ethical Hacking (Course Code: IT504-T):

CO1: To describe the concepts of ethical hacking.

CO2: To understand the stages of a cyber-attack.

CO3: To describe and perform basic reconnaissance exercises.

CO4: To scan and enumerate a network and computer systems.

CO5: To understand types of malware and cyber-attack vectors and players.

CO6: To execute basic attacks against network and computer systems.

CO7: To describe and perform various methods for evading security controls.

CO8: To describe and perform vulnerability and pen testing assessments and exercises.

Data Warehousing (Course Code: IT505-T)

CO1: To evaluate the different models of OLAP and data preprocessing.

CO2: To apply algorithms used in information analysis of data mining techniques.

CO3: To enhance problem solving skills.

Core Java-II (Course Code: IT507-T):

CO1: To understand input/output stream used in Java.

CO2: To learn utilities in Java language.

CO3: To provide an overview of database access and details for managing information using the JDBC API.

CO4: To write simple GUI interfaces for a computer program to interact with users, and to understand event-based GUI handling principles.

CO5: To learn use of Java applets for creating interactive web programs: Fonts, color, graphics, and animation.

CO6: To learn use of Java applets to create interactive web programs by sending and receiving parameters in an Applet.

Pr. Based on DCN & Pr. Based on PHP (LAB) (Course Code: IT509-P):

Learners will be able to….

CO1: Describe standard network models.

CO2: Understand guided transmission media.

CO3: Analyze error detection and error correction codes.

CO4: Understand the concepts behind medium access control sub layer.

CO5: Understand working of server-side programming on web.

CO6: Understand PHP basic syntax for variable types and calculations.

CO7: Create conditional structures.

CO8: Store data in arrays.

CO9: Use PHP built-in functions and creating custom functions.

Pr. Based on Data Warehouse & Pr. Based on Core Java-II (LAB): Course Code: IT510-P

CO1: To evaluate models of OLAP and data pre-processing.

CO2: To enlist algorithms used in information analysis of data mining techniques.

CO3: To demonstrate the knowledge retrieved through problems solving.

CO4: To understand input/output Stream used in Java.

CO5: To learn utilities in Java language.

CO6: To provide an overview of database access and details for managing information using the JDBC API.

CO7: To write up simple GUI interfaces for a computer program to interact with users, and to understand the event-based GUI handling principles.

CO8: To learn use of Java applets to create interactive web programs: Fonts, color, graphics, and animation.

CO9: To learn use of Java applets to create interactive web programs by sending and receiving parameters in an Applet.

Software Testing and Quality Assurance -Course Code: IT601-T:

CO1: Learner will be able to identify benefits and the needs to enforce software quality.

CO2: Learner will be able to differentiate between quality control, quality management and quality assurance.

CO3: Learner will be able to discuss software quality factor models.

CO4: Learners can acquire systematic approach to the operation, maintenance and development of software.

CO5: Learner can understand tools of testing and maintenance of softwares.

CO6: Student can learn use of available resources to develop software, reduce cost of software and maintaining the quality of software.

Wireless Networking -Course Code: IT602-T

Students will be able to……

CO1: Identify the basic concepts of wireless networks.

CO2: Analyze traffic theories, mobile radio propagation, channel coding, and cellular concepts.

CO3: Compare and contrast multiple division techniques, mobile communication systems, and existing wireless networks.

CO4: Classify network protocols, sensor networks, wireless MANs, LANs and PANs.

CO5: Apply wireless ID technologies, in particular RFID work.

Advanced Programming with PHP -Course Code: IT603-T

CO1: Maintaining state using cookies, session variables, hidden form fields and query strings.

CO2: Using PHP to manipulate files.

CO3: Identifying and handling the types of errors that can occur while programming with PHP.

CO4: Understanding of object oriented programming in PHP

CO5: Use of an object-oriented API to access SQL to SELECT, INSERT, UPDATE and DELETE data from tables.

CO6: Using the phpMyAdmin utility to administer the MySQL database.

CO7: Using OOP in PHP to define and use classes.

Cyber Law and Security- Course Code: IT604-T

Learners will be able to ….

CO1: Describe laws governing cyberspace and analyze the role of internet governance in framing policies for internet security.

CO2: Discuss different types of cybercrimes and analyze legal frameworks of different countries to deal with these cybercrimes.

CO3: Explain the importance of jurisdictional boundaries and identify the measures to overcome cross jurisdictional cybercrimes.

CO4: Illustrate the importance of ethics in legal profession and determine the appropriate ethical and legal behavior according to legal frameworks.

CO5: Identify intellectual property right issues in the cyberspace and design strategies to protect intellectual property.

CO6: Assess legal issues with online trading, and analyze applicable e-contracting and taxation regulations.

CO7: Create security policy to comply with laws governing privacy and develop policies to ensure secure communication.

CO8: Recognize the importance of digital evidence in prosecution and compare laws of different countries that govern standard operating procedures for handling evidence.

Data Mining -Course Code: IT605-T

CO1: To understand basic terminology.

CO2: To display a comprehensive understanding of different data mining tasks and the algorithms for addressing them.

CO3: To evaluate models/algorithms with respect to their accuracy.

CO4: To demonstrate capacity to perform a self-directed piece of practical work that requires application of data mining techniques.

CO5: To critique the results of a data mining exercise.

CO6: To develop hypotheses based on the analysis of the results obtained and evaluate its validity.

CO7: To conceptualize a data mining solution to a practical problem.

C++ Programming -Course Code: IT607-T

A student will be able to …..

CO1: Understand the structure and model of programming language C++.

CO2: Use the programming language C#.

CO3: Evaluate user requirements for software functionality required to decide whether the programming language C++ can meet user requirements.

CO4: Propose the use of certain technologies by implementing them in the C++ programming language to solve a given problem.

CO5: Choose an engineering approach to solve problems.

Pr. Based on PHP & C++ (LAB) -Course Code: IT609P

CO1: To identify and handle errors that can occur while programming with PHP.

CO2: To introduce learner with object oriented programming in PHP

CO3: To use an object-oriented API to access SQL to SELECT, INSERT, UPDATE and DELETE data from tables.

CO4: To using the phpMyAdmin utility to administer the MySQL database.

CO5: To use OOP in PHP to define and use classes.

CO6: To choose an engineering approach to solve problems, starting from the acquired knowledge of programming and knowledge of operating systems.

CO7: To understand conversion functions used in C++.

CO8: To apply basic data type manipulations.

CO9: To understand interfaces, classes and inheritance in C++.

CO10: To use objects in C++.

Major Project: Course Code: IT610P

A learner will be able to….

CO1: Formulate a real world problem and develop its requirements.

CO2: Develop design solutions for a set of requirements.

CO3: Test and validate the conformance of the developed prototype against the original requirements of the problem.

CO4: Work as a responsible member and possibly a leader of a team in developing software solutions.

CO5: Express technical and behavioral ideas and thoughts in oral settings.

CO6: Participate in and possibly moderate, discussions that lead to making decisions.

CO7: Express technical ideas, strategies and methodologies.

CO8: Prepare and conduct oral presentations.

CO9: Self learn new tools, algorithms, and/or techniques that contribute to the software solution of projects.

CO10: Generate alternative solutions, compare them & select the optimum one.

M. Sc. (I.T.) First Year (I semester)

Object Oriented Programming in C^{++}: Course code: CSI401

Students will be able to….

CO1: Acquire an understanding of all object oriented concepts and issues involved in effective class design.

CO2: Write C^{++} programs that use object oriented concepts such as information hiding, constructors, destructors, inheritance, file handling, exception handling, polymorphism and template etc.

CO3: Develop the programming skill in students.

CO4: Write C^{++} programs using the more esoteric language features.

CO5: Utilize object oriented techniques to design C^{++} programs.

CO6: Use the standard C^{++} library.

CO7: Exploit advanced C^{++} techniques.

Computer System Architecture: Course code: CSI402

CO1: To get familiar with concepts of architecture of computer and different electronics devices required to develop a computer.

CO2: To learn number systems and their representation, arithmatics of different number systems.

CO3: To understand basic logic gates, Boolean algebra and K-maps.

CO4: To study arithmetic circuits, combinational circuits and sequential circuits, flip flops and registers.

CO5: To study comparative aspects of logic families.

Operating System: Course code: CSI403

Students will be able to….

CO1: Master functions, structures and history of operating systems.

CO2: Master understanding of design issues associated with operating systems.

CO3: Understand the process management concepts including scheduling, synchronization, and deadlocks.

CO4: Familiar with multithreading.

CO5: Master concepts of memory management including virtual memory.

CO6: Master system resources sharing among the users.

CO7: Master issues related to file system interface and implementation and disk management.

CO8: Familiar with protection and security mechanisms.

CO9: Familiar with various types of operating systems including UNIX.

CO10: To understand operating system and their components.

CO11: To understand functionality of operating systems like memory management, process management, I/O management, storage management.

CO12: To make the learner able to analyze the real perspective of operating system in network, distributed, parallel and multi core environment.

Relational Database Management System: Course code: CSI404

CO1: To know about database system basic concepts, architecture, features, purpose and advantage of DBMS.

CO2: To learn components of a DBMS: Users, facilities & structures.

CO3: To learn data modeling & design.

CO4: To learn entity-relationship data model.

CO5: To understand about basics of relational model, normalization, relational algebra.

CO6: To provide students with an understanding of relational model, relational database design, and SQL.

CO7: Students will construct SQL queries using SQL.

CO8: To provide students with a working knowledge of the underlying architecture and implementation of modern database systems.

CO9: To study integrity constraints, indexing methods, transaction management and query processing.

M.Sc.(I.T.) First Year (II semester)

Programming in Core Java: Course code: CSI405

CO1: To acquire knowledge and skills needed to develop applications in Java for Microsoft and sun platform.

CO2: To focus on fundamental concepts, designing user interfaces, program structure, language syntax, and implementation details.

CO3: To implement object oriented programming concepts.

CO4: To use and create packages and interfaces in a Java program

CO5: To use graphical user interface in Java programs.

CO6: To create applets.

CO7: To implement exception handling in Java.

CO8: To implement multithreading.

CO9: To use input/output streams.

CO10: To handle security implementations in Java.

Software Engineering and CASE Tools Course code: CSI406

CO1: To provide theoretical and practical foundations in software engineering.

CO2: To understand the principles and methods of software engineering, including current and emerging software engineering practices and support tools.

CO3: To familiarize with the development of software products from an industry perspective, including generation of appropriate documents, under tight schedules and limited resources.

CO4: To broaden knowledge of Software Process Models.

CO5: To be aware of software products

CO6: To increase proficiency in software project management.

CO7: To gain proficiency in engineering.

CO8: To gain practical experience in UML tools.

CO9: To acquire the background of software architecture.

CO10: To understand and be able to explain software metrics and software.

CO11: To learn concepts associated with software construction.

CO12: To learn about software verification.

CO13: To understand case study based on software life cycle.

CO14: To develop, implement, and demonstrate learning through a project that meet stated specifications.

CO15: To learn user interface design.

CO16: To understand software cost estimation and web engineering.

Data Structure and Algorithms: Course code: CSI407

CO1: To understand the principles of data structure, algorithms and issues related to allocation of memory, optimization of algorithms, time and space complexity associated with algorithms, sorting, searching algorithms applied on data structures.

CO2: To understand the fundamental data structures, including lists, stacks, queues, trees, and graphs, and it examines classic algorithms that use

these structures for tasks such as sorting, searching, pattern matching, and data compression.

CO3: To apply analyzing techniques to improve efficiency of algorithms.

CO4: To apply the key notions of object-oriented programming, including encapsulation and abstract data types.

Computer Network: Course code: CSI408

CO1: To study various structure and topologies of communication media.

CO2: To understand the basic concepts and terminology in computer networks.

CO3: To know the physical layer issues in computer networks, types of network topologies and protocols.

CO4: To understand the error correction, detection and MAC protocols.

CO5: To learn the concepts associated with submitting and routing mechanisms.

CO6: To understand issues associated with transport layer protocols.

CO7: To understand the application layers, basic issues associated with security, multimedia, and network management.

CO8: To understand network industry standards such as routing protocols, address resolution and reverse address resolution protocols, IP addresses, and mac addressing.

Programming in Advance Java (CSI501)

CO1: To understand and apply the graphics and animation on the web pages, using Java Applets.

CO2: To understand and design a full set of event driven UI widgets and other components, including windows, menus, buttons, checkboxes, text fields, scrollbars and scrolling lists, using Abstract Windowing Toolkit (AWT) & Swings.

CO3: To understand Java data base connectivity to retrieve and manipulate the information on rational database through Java programs.

CO4: To understand server side programming using Servlets and JSP.

CO5: To understand Java bean to use the reusable software components.

CO6: To understand the invocation of the remote methods in an application using RMI.

CO7: To learn the development of enterprise based applications, using EJB.

CO8: To familiarize students with struts frameworks which provides opportunity to reuse the codes for quick development.

CO9: To understand Hibernate for mapping of Java classes and objects associations to the relational database tables.

CO10: To cover threading and goes up to web programming.

CO11: To cover advance topics of reflection, applets, and swings, JDBC, Networking, JSP and Servlet.

Decision Support System and Intelligent system (CSI502):

CO1: To provide logic based frameworks for design and implementation of decision support system and intelligent system.

CO2: To apply logic to take correct decisions.

CO3: To understand the concept of decision support system methodologies and technologies.

CO4: To understand the different types of modeling and analysis.

CO5: To apply data warehouse concept with proper working of ETL system.

CO6: To understand visualization of data.

CO7: To understand basic concept of data, web and text mining.

CO8: To understand the concept of neural network for data mining.

CO9: To understand the concept of collaboration, communication, group support systems, and knowledge management collaborative computing supported.

CO10: To understand technologies and group support systems.

CO11: To know the intelligent systems over the internet.

Network Security (CSI503)

After completing the course, students will be able to understand…..

CO1: Basic security services.

CO2: Basic concepts of risk, threats, vulnerabilities and attack.

CO3: Important ethical and legal issues in computer security.

CO4: Goals of end-to-end data security.

CO5: Role of random numbers and prime numbers in security.

CO6: Standard symmetric encryption algorithms.

CO7: Architecture for public and private key cryptography.

CO8: Methods of digital signature and encryption.

CO9: Key management and exchange of protocol work.

CO10: Security protocols at different layers of network layer hierarchy.

CO11: Futuristic cryptographic techniques including elliptic curve and quantum cryptography.

CO12: Concept of trusted computing.

CO13: Web security protocols.

ASP.NET (CSI504)

CO1: To understand the design and development of web application.

CO2: To apply ASP. NET for building good web application using databases, security and web services.

CO3: To build dynamic web application.

CO4: To undertake commercial web development projects.

CO5: To expose technology of Microsoft ASP.NET adopted by the industry.

Programming VB. NET (CSI505)

CO1: To acquire knowledge and skills needed to develop applications in Microsoft Visual Basic.NET for the Microsoft.NET platform.

CO2: To focus on user interfaces, program structure, language syntax, and implementation details.

CO3: To understand the visual basic.NET.

CO4: To create a simple visual basic NET–based application using Windows application template.

CO5: To use forms and controls to create a user interface.

CO6: To create and use variables and arrays.

CO7: To create and use sub and function procedures, including predefined functions.

CO8: To implement decision structures and loops by using conditional expressions.

CO9: To validate user input for fields, controls, and forms.

CO10: To apply object-oriented programming techniques.

CO11: To resolve syntax, run-time, and logic errors by using the debugger and structured exception handling.

CO12: To enhance the user interface by adding menus, status bars, and toolbars.

CO13: To create a simple visual basic.NET-based web forms application that uses an XML web service.

CO14: To access and manipulate data in a Microsoft access or Microsoft SQL Server™ database by using Microsoft ADO.NET.

CO15: To build package and deploy an application.

Open Source Web Programming using PHP (CSI506)

CO1: To acquire genuine domain knowledge using application development, and object oriented PHP as the programming environment.

CO2: To understand working of server-side programming on the web.

CO3: To understand the PHP Basic syntax for variable types and calculations.

CO4: To create conditional structures.

CO5: To store data in arrays.

CO6: To use PHP built-in functions and creating custom functions.

CO7: To develop web application of open source platform and aware of configuration of tools required to development of web application.

Major Project (CSI557)

CO1: To formulate a real world problem and develop its requirements.

CO2: To develop a design solution for a set of requirements.

CO3: To test and validate the conformance of developed prototype against the original requirements of problem.

CO4: To work as a responsible member and possibly a leader of a team in developing software solutions.

CO5: To express technical, behavioral ideas and thought in oral settings.

CO6: To participate in discussions that lead to making decisions.

CO7: To express technical ideas, strategies and methodologies in written form.

CO8: To prepare and conduct oral presentations.

CO9: To understand new tools, algorithms, and/or techniques that contributes to the software solution of projects.

CO 10: To generate alternative solutions, compare them and select the optimum one.

Seminar (CSI558)

CO1: To acquire new technologies while searching the topic.

CO3: To enhance presentation skills of the learner.

COs: Electronics

B.Sc. Electronics Semester-I ELE 101 [Network theorems and semiconductor devices]

CO1: To understand electronic passive and active components.

CO2: To understand basics of P-N junction diodes and their types.

CO3: To understand basics of transistor JFETS and their working.

CO4: To understand basics of power supplies using semiconductor diodes and IC's.

[DIGITAL ELECTRONICS – I]

CO1: To understand basics of number systems, binary, octal, hexadecimal etc.

CO2: To understand basics of logic gates and their working symbols

CO3: To understand basics of Boolean algebra and theorems.

CO4: To understand basics of combinational logic circuits and their applications.

Semester-II ELE 201 [AMPLIFIERS]

CO1: To understand types of biasing techniques of transistor.

CO2: To understand 2- port technique of analysis of transistor amplifier.

CO3: To understand feedback technique of study of transistor amplifier.

CO4: To understand the types of power amplifiers and their working.

DIGITAL ELECTRONICS - II]

CO1: To understand the basics of flip-flops, their types and working.

CO2: To understand the working of counters their types and uses.

CO3: To understand the basics of shift registers, types and applications.

CO4: To understand the types of memories used to store data, their working.

CO5: To understand the types of converters used to transfer the digital data in analog form.

[LINEAR INTEGRATED CIRCUITS]

CO1: To understand the working of OP-AMP integrated amplifier system.

C**O2:** To understand the applications of OP-AMP.

CO3: To learn and understand the working of oscillators used in electronic generators.

CO4: To understand the working of timer IC 555 and its applications.

[8086 MICROPROCESSOR]

CO1: To understand the basics of 8086 microprocessor.

CO2: To enable learners to understand the instruction Set of 80806 microprocessor.

CO3: To enable learners to understand the assembly language programming.

Semester-IV

ELE 401 [COMMUNICATION ELECTRONICS]

CO1: To understand the types of modulation techniques.

CO2: To understand the pulse modulation techniques.

CO3: To understand the different ways of modulation and detection.

CO4: To understand the digital communication techniques.

ELE 402 [8086 MICROPROCESSOR INTERFACING]

CO1: To understand the interfacing of memories and I/O.

CO2: To understand the programming using IC 8255.

CO3: To understand the communication interface using IC 8251.

CO4: To understand the programmable interval timer IC 8253.

Semester-V Ele 501: Power Electronics

CO1: To familiarize with the power components and their characteristics.

CO2: To understand the concept of electronic sensors.

CO3: To understand the knowledge of different types of electronic sensors.

CO4: To apply sensors for detection of an object.

CO5: To get an idea of industrial motors and power requirements.

CO6: To understand the concept of industrial motor speed control and methods.

Ele 502(A): Microcontroller –I

A learner of this course will be able to understand ……

CO1: Embedded systems.

CO2: Difference between microprocessor and microcontroller

CO3: Fundamentals of microcontroller

CO4: Basics of microcontroller hardware specific to 8051 microcontroller

CO5: Microcontroller instructions

CO6: Applications of microcontroller.

Semester-VI Ele 601(A): Programmable Logic Controller

Students will be able to understand …..

CO1: Industrial controls

CO2: Relay logic concept

CO3: Ladder logic concept

CO4: Basics of PLC system

CO5: PLC instructions

CO6: Development of ladder logic for specific industrial control system.

Ele602 (A): Microcontroller – II

After completing the course, students will learn and understand…..

CO1: Microcontroller internal blocks.

CO2: Timer and counter block and their programming.

CO3: Serial communication and its programming.

CO4: Interrupt and its programming.

CO5: Programming to LCD, ADC and DAC to microcontroller.

CO6: Application of microcontroller in various domains.

M.Sc. Electronics Embedded Systems - I (ELEC-111)

Students will be able to …..

CO1: Understand the family of microprocessor and microcontroller with comparison.

CO2: Understand the architecture, instruction set and working of 8051Microcontroller.

CO3: Understand the concept of timer, interrupts and I/O port interfacing with 8051 microcontroller.

CO4: Understand the interfacing circuit for applications of 8051 microcontroller including LEDs, LCD, Keypad Matrix, Switches and Seven segment displays.

CO5: Write the assembly language program for different applications, upload in microcontroller IC and execute as per the desired requirement.

CO6: Understand the concept of real time operating system.

PC Based Instrumentation (ELEC-112)

CO1: To understand the principles of data acquisition.

CO2: To understand the data acquisition using serial interface.

CO3: To apply data acquisition using USB and IEEE.

CO4: To apply networked data acquisition.

Industrial Power Electronics (ELEC-113)

Students will be able to …..

CO1: Understand the working of power switching devices in electronics.

CO2: Understand working of phase controlled rectifiers, inverters and UPS.

CO3: Understand the working of DC to DC and AC converters.

Signal Conditioning Circuit Design Code No.: ELEC-114

CO1: To understand analog signal conditioning circuits.

CO2: To understand characteristics and parameters of operational amplifiers.

CO3: To understand the working of operational amplifier circuits in instrumentation.

CO4: To understand the components of digital signal conditioning

CO5: To understand the principles involved in the working of signal conditioners.

Embedded Systems –II (PIC Microcontroller) Code No.ELEC-211

CO1: To understand the family of PIC and AVR microprocessor and comparison with microcontroller.

CO2: To understand the architecture, instruction set and working of PIC and AVR Microcontroller.

CO3: To understand the concept of timer, interrupts and I/O port interfacing with PIC and AVR microcontroller.

CO4: To understand the interfacing circuit for applications of PIC and AVR microcontroller including LEDs, LCD, Keypad Matrix, Switches and Seven segment displays.

CO5: To write the assembly language program for application, upload in microcontroller IC and execute as per the desired requirement.

Biomedical Electronics and Instrumentation Code No. : ELEC-212

Students will be able to …..

CO1: Understand the working of bio-electric signals and electrodes.

CO2: Understand the working of physiological transducers.

CO3: Understand the concept of bio-medical recorders.

CO4: Understand the functioning of electrocardiography.

CO5: Understand the cardiovascular measurement along with the measuring devices.

CO6: Understand the instrumentations for measuring the brain function.

Industrial Monitoring and Control Systems Code No. : ELEC-213

The students will be able to …..

CO1: Understand temperature sensors with signal conditioning circuit for measurement of temperature.

CO2: Understand flow meters for measurement of flow in air, solid and liquid along with pressure.

CO3: Understand pressure sensors for measurement of pressure.

CO4: Understand the different level sensors for measurement of levels in solids and liquids.

Wireless Communication Systems and Networks Code No. : ELEC-214

The students will be able to understand…..

CO1: Basics of wireless communication system.

CO2: Wireless telecommunication systems and networks.

CO3: Components used in common cellular system.

CO4: Wireless network architecture and operations.

CO5: Technology used in GSM, TDMA and CDMA

CO6: Cellular wireless data networks

Smart Fusion Technology based System Design Code No. : ELEC-311

The students will be able to …..

CO1: Understand the basic concept of fusion technology.

CO2: Understand the architecture of smart fusion device.

CO3: Understand the programmable analog system and development tools for microsemi smart fusion device.

CO4: Understand programmable design system for temperature measurement, humidity measurement, mobile communication and core of 8051 microcontroller.

Sensors and Actuators Code No.: ELEC-312

The students will be able to

CO1: Understand the Passive Electrical Transducers

CO2: Understand the Active Electrical Transducers

CO3: Understand the Actuators

CO4: Understand the Electric motors (ac, dc and serve)

CO5: Understand the Variable Speed drives (ac drive and dc drive)

PLC based Industrial Automation Code No. : ELEC-313

The students will be able to …..

CO1: Understand the basics and need of PLC.

CO2: Understand the input and output modules used with PLC.

CO3: Understand the working of I/O module of PLC, programming language and instructions of PLC.

CO4: Write/draw the ladder programs.

CO5: Understand the PLC interfacing and trouble shooting.

CO6: Understand the control loop characteristics and control parameter of PID controller.

CO7: Understand different PID modes.

ARM Microcontroller: ELEC-314

The students will be able to …..

CO1: Understand the family of ARM processor and able to compare with other controllers.

CO2: Understand the fundamental of ARM processor such as registers, interrupts and pipeline concept.

CO3: Understand the ARM instruction set and thumb instruction set.

CO4: Understand the concept of timer, interrupts and GPIO interfacing with ARM controller.

CO5: Write the basic programs in embedded C for applications related to project.

Project Management and Quality Standards Code No. : ELEC-411

The students will be able to …..

CO1: Understand the basics of project management including documentation.

CO2: Understand the monitoring, control and costing in project development

CO3: Understand the types of quality system standards followed during the project development.

CO4: Understand the total quality management system and different ISO elements.

Elective-C: HMI, SCADA basics and Databases Code No. : ELEE-412

The students will be able to …..

CO1: Understand the automation tools for PLC, DCS, SCADA, Hybrid DCS/PLC.

CO2: Understand the different instrumentation standard protocols.

CO3: Understand the basics of MMI/HMI human machine interface.

CO4: Understand the configuration of different drivers and gateways.

CO5: Understand the Database of tags and their applications.

CO6: Understand drivers of SCADA s/w, configuration of drivers file in s/w along with analog entry and connectivity among softwares.

COs: Microbiology

B.Sc. Microbiology B. Sc. I year- Semester I Paper I. Fundamentals of Microbiology

CO1: To familiarize students with the basic concepts related with viruses and prokaryotic cells.

CO2: To understand the fundamental concepts of microbiology.

CO3: To study molecular and structural unity of microbial life.

B. Sc. I year - Semester I Paper II. Microbiological Techniques and General Microbiology

CO1: To understand different microbes and microbial techniques.

CO2: To exploit useful microorganisms and the control the harmful ones.

CO3: To isolate microorganisms in pure form and understand the significance of pure culture.

CO4: To understand the methods of cultivation and preservation of microbial cultures.

CO5: To understand and use methods of visualizing microorganisms and practical aspects of sterilizing techniques.

B. Sc. I year- Semester II Paper V. Cytology and General Microbiology

CO1: To identify and describe the parts of a bacterial cell.

CO2: To demonstrate the function of each bacterial cell structure.

CO3: To understand the types of nutrients used by microorganisms for growth and metabolism.

B. Sc. I year- Semester II Paper VI. Basic Biochemistry

CO1: To study microorganisms.

CO2: To understand the basic concepts of biochemistry.

CO3: To understand carbohydrates, lipids, proteins, nucleic acids, pH and buffers.

B.Sc. II year- Semester III Paper VII. Environmental Microbiology.

CO1: To understand the significance of air pollution, air sanitation, air as carrier of microorganism and significance of air flora in human health, hospitals and industries.

CO2: To determine the sanitary quality of water.

CO3: To understand the indicators of fecal pollution and methods to sanitize potable water.

CO4: To understand sewage treatment and disposal.

B.Sc. II year- Semester III Paper VIII. Immunology

CO1: To study the significance of normal flora, normal defensive mechanism of host, virulence factors of microorganisms and process of infection.

CO2: To understand the types of immunity and their mechanism, general methods of prophylaxis.

CO3: To understand the immunological concepts with reference to antigens, antibody and antigen- antibody reaction.

Paper XI. Applied Microbiology.

CO1: To understand the composition of milk, sources of microorganisms in milk, desirable and undesirable changes brought by microorganisms in milk, diseases spread by milk, microbiological examination of milk.

CO2: To understand sterilization and pasteurization of milk.

CO3: To understand the groups of microorganisms in food, principles of food preservation, microbial spoilage of canned and non- canned foods, food borne diseases, intoxication, fermented foods and probiotics.

B.Sc. II year- Semester IV Paper XII. Clinical Microbiology.

CO1: To understand concepts in etiology, pathogenesis laboratory diagnosis, epidemiology, prophylaxis, chemotherapy of human diseases caused by bacteria, viruses, fungus and protozoa.

CO2: To understand diseases caused by microbes such as tuberculosis, syphilis, malaria, typhus fever, candidiasis, typhoid, and cholera, infection caused by Staphylococcus aureus, Streptococcus pneumoniae, HIV, Hepatitis virus, and oncogenic viruses.

B.Sc. III year- Semester V Paper XV. Microbial Genetics

CO1: To understand and apply the principles and techniques of molecular biology which prepares students for further education and employment in teaching, basic research, or the health professions.

CO2: To study core molecular genetics and concepts including molecular biology, genetics, cell biology and physiology.

B. Sc. III year- Semester V Paper XVI. Microbial Metabolism.

CO1: To understand the basic concepts of metabolism and free energy.

CO2: To introduce learners with types of energy yielding metabolism, comparative account of fermentation, respiration and photosynthesis.

CO3: To aware the students of pathways of carbohydrate fermentation.

CO4: To familiarize students with basic concepts of action, functioning and inhibition of enzymes.

CO5: To understand the aspects of aerobic respiration, biosynthesis of nucleotides, catabolism of unsaturated fatty acids and nucleic acids.

B.Sc. III year- Semester VI Paper XIX. Recombinant DNA technology

CO1: To understand core molecular genetics concepts including molecular biology, genetics, cell biology and physiology.

CO2: To demonstrate working knowledge in a defined skill set of molecular biology and biotechnology protocols including PCR, plasmid isolation, gene isolation, cloning and DNA sequencing.

B. Sc. III year- Semester VI Paper XX. Industrial Microbiology.

CO1: To acquaint with historical events in industrial microbiology, design of a fermenter, IP and WHO standards of sterility.

CO2: To familiarize learners with screening methods, preservation of industrial strain, strain improvement methods, inoculum and fermentation medium development.

CO3: To make aware of different typical fermentations such as penicillin, vitamin B12, L-Lysin, ethyl alcohol, citric acid, amylase and Baker's yeast.

M.Sc. I & II Year
Microbiology

PAPER TH-I Biostatistics, Computer Applications and Research Methodology

Students will be able to understand.....

CO1: Introduction to biostatistics

CO2: Measures of central tendency - Mean, Median, Mode

CO3: Tests of significance

CO4: Introduction to computers and computer applications

CO5: Basics of research methodology

PAPER TH-II BIOENERGETICS AND ENZYMOLOGY

Leaners will be able to understand.....

CO1: Carbohydrate catabolic pathways and microbial growth on C1 compounds

CO2: Bacterial fermentations and Biosynthesis

CO3: Endogenous metabolism and degradation of aliphatic and aromatic compounds

CO4: Properties of Enzymes and Enzyme kinetics

PAPER TH-III BIOINSTRUMENTATION TECHNIQUES AND APPLICATIONS

Students will be introduced to ....

CO1: Basic laboratory instruments

CO2: Chromatographic techniques

CO3: Electrophoretic techniques

CO4: Basics of spectroscopy

CO5: Radio isotopic techniques

Paper TH-Iv Industrial Food and Dairy Microbiology

Students will understand…..

CO1: Industrial food fermentations

CO2: Industrial dairy fermentations

CO3: Advanced food and dairy microbiology

CO4: Food preservation methods and utilization of dairy waste

CO5: Food spoilage and quality assurance

SEMESTER II PAPER TH-V Recent Trends in Virology

CO1: Classification and morphology of viruses

CO2: Cultivation and assay of viruses

CO3: Viral multiplication

CO4: Pathogenesis of viruses

CO5: Control of viruses and emerging viruses

PAPER TH-VI MOLECULAR IMMUNOLOGY

Learners will be able to understand…..

CO1: Immune system

CO2: Antigens and immunoglobulin

CO3: Antigen – antibody reactions

CO4: Expression and regulation of immune response

CO45: Immunity and immunoassays.

PAPER TH-VII MICROBIAL PHYSIOLOGY

After completing the course, students will be able to understand ….

CO1: Photosynthesis

CO2: Bacterial respiration - aerobic respiration and anaerobic respiration

CO3: Bacterial permeation - structure and organization of membrane

CO4: Bacterial sporulation

CO5: Bacterial chemolithotrophy and nitrogen Metabolism:

PAPER TH-VIII: MICROBIAL DIVERSITY AND EXTREMOPHILES

CO1: To understand ecology - community ecology, mycorrhiza, marine ecosystem

CO2: To understand the characteristics and classification of Archaebacteria

CO3: To familiarize leaners with alkalophiles and acidophiles

CO4: To understand halophiles and Barophiles

PAPER IX ENZYME TECHNOLOGY

CO1: To understand extraction and Purification of Microbial Enzymes

CO2: To understand **e**nzyme Inhibition and Kinetics

CO3: To study immobilization of enzymes and Bioconversion Processes

CO4: To familiarize with enzyme/protein engineering

CO5: To understand clinical Enzymology

PAPER X BIOPROCESS ENGINEERING AND TECHNOLOGY

Students will be able to understand….

CO1: Industrial bioprocess engineering

CO2: Bioreactors

CO3: Mass transfer and sterilization

CO4: Upstream processes

CO5: Down Stream Process

PAPER TH-XI Molecular Microbial Genetics

After completing the course, learners will be introduced to….

CO1: Deoxyribonucleic acids

CO2: Types of nucleotide sequences- non-repetitive and repetitive.

CO3: Physical characteristics of DNA-Forms of DNA, DNA replication and modification.

CO3: Mutations at molecular level – Transitions, Transversions, Missense Mutations

CO4: Suppressions & reversions

CO5: Repair mechanisms: - Photo reactivation, Excisions, Retrieval systems, Mismatch repair & SOS Repair

CO6: Prokaryotic transcription and translation

CO7: Regulation of gene expression in prokaryotes

CO8: Transposition and molecular mapping

CO9: Phage genetics

PAPER TH-XII (ENVIRONMENTAL MICROBIAL TECHNOLGY

CO1: To understand environment and ecosystems

CO2: To understand eutrophication

CO3: To understand effluent treatment techniques

CO4: To understand bioremediation of Xenobiotics

CO5: To understand global environmental problems

PAPER TH - XIII RECOMBINANT DNA TECHNOLOGY

CO1: Introduction, Core technique and Enzymes in gene manipulation

CO2: Tools and Techniques involved in genetic engineering

CO3: Vectors used in gene cloning

CO4: Technique of gene cloning

CO5: Applications of genetic engineering and PCR

PAPER TH-XIV: FERMENTATION TECHNOLOGY

Students will be able to understand….

CO1: Microbial fermentations

CO2: Microbial production of therapeutic compounds

CO3: Modern trends in microbial production

CO4: Biofuels and plant tissue culture

CO5: IPR and patents

PAPER TH-XV BIOINFORMATICS, MICROBIAL GENOMICS AND PROTEOMICS.

CO1: To introduce learners to bioinformatics.

CO2: To understand the history of bioinformatics and internet.

CO3: To understand genome analysis

CO4: To know the sequence analysis

CO5: To understand DNA – Microarray

CO6: To understand proteomics

Paper XVI: Pharmaceutical Microbiology

Students will be able to understand…..

CO1: Principles of antimicrobial chemotherapy

CO2: Molecular aspects of antimicrobial chemotherapy

CO3: Microbial production and spoilage of pharmaceutical products

CO4: Regulatory practices and policies in pharmaceutical industries.

CO5: Quality assurance and validation.

COs: Biotechnology

B.Sc. Biotechnology Paper-I: Physical Chemistry

After completion of course/paper students will be able to:

CO1: Understand basic concepts in thermodynamics, kinetics and redox reactions.

CO2: Acquire skills in kinetics and chemical reactions.

Paper-II: Organic and Inorganic Chemistry

After completion of course/paper students will be able to:

CO1: To acquaint students with bioorganic molecules.

CO2: To impart the knowledge of classification, structure and characterization of biomolecules.

Paper-III: Microbial cell diversity

After completion of course, students will be able to:

CO1: Study origin, evolution, and genetic diversity of microbial life

CO2: Study physiological diversity of metabolic and bioenergetics pathways

CO3: Understand the process of microbial speciation.

Paper-IV: Biostatistics

After completion of course, students will be able to:

CO1: Use and interpret results of descriptive statistical methods effectively.

CO2: Demonstrate the central concepts of modern statistical theory and their probabilistic foundation.

CO3: Select from, use, and interpret results of, the principal methods of statistical inference and design.

CO4: Communicate the results of statistical analyses accurately and effectively.

CO5: Make appropriate use of statistical softwares.

CO6: Read and learn new statistical procedures independently.

Paper-V: Instrumentation

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

CO1: Understand safety measures in laboratory, handling and take care of instruments.

CO2: Determine pK_a and preparation of standard solutions.

CO3: Understand staining techniques.

CO4: Understand biochemical test, specific gravity and viscosity.

CO5: Understand motility testing by hanging drop method.

Paper-VI: Biomolecules

After completion of course, students will be able to undertsand….

CO1: Basic components or biomolecules of living organisms

CO2: To understand the classification, biological function and chemical and physical properties of carbohydrates, lipids, nucleic acids and proteins.

Paper-VII: Organic Chemistry

After completion of course, students will be able to:

CO1: Demonstrate an intermediate ability to use effective written and/or oral communication through the application of organic chemistry concepts and reasoning using the language of chemistry.

CO2: Demonstrate basic understanding of organic chemistry impacts on natural and technological environments.

CO3: Demonstrate an intermediate ability to use detailed data collection and analysis in order to explore organic chemical principles, effectively communicate, and critically evaluate results in the context of the material covered in organic chemistry.

CO4: Demonstrate basic understanding of organic chemistry principles effectively to solve problems encountered in everyday life and in science using appropriate computational skills.

Paper-VIII: Inorganic and Physical Chemistry

CO1: Students will be able to design and carry out scientific experiments as well as accurately record and analyze the results of experiments.

CO2: Students will be skilled in problem solving, critical thinking and analytical reasoning as applied to scientific problems.

CO3: Students will be able to clearly communicate the results of scientific work in oral, written and electronic formats to both scientists and the public at large.

CO4: Students will be able to explore new areas of research in both chemistry and allied fields of science and technology.

Paper-IX: Microbial growth and control

After completion of course, students will be able to…..

CO1: Recognize and explain the significant role that microbes play in the world around us.

CO2: Recognize and explain similarities and differences of microbes as compared to higher forms of life.

CO3: Identify microbes and explain methods of growth and cultivation as well as structural and biochemical differences.

CO4: Demonstrate an understanding of microbial structure, function, metabolism, growth, genetics, and control including antibiotic usage.

CO5: Explain the basic principles of immunology related to host resistance, antigen-antibody reactions, vaccination, organism virulence and their ability to cause disease.

CO6: Evaluate the physical and chemical methods of microbial control.

Paper-X: Biomathematics

After completion of course, students will be able to …..

CO1: Apply mathematical concepts and principles to perform computations in life sciences.

CO2: Apply mathematical concepts to solve problems in biology.

CO3: Create, use and analyze graphical representations of mathematical relationships.

CO4: Communicate mathematical knowledge and understanding.

CO5: Apply technology tools to solve problems in biological systems.

Paper-XI: Macromolecules

After completion of course, students will be able to:

CO1: Name and outline mechanisms for the non-covalent forces that operate in biomolecules.

CO2: Discuss the four structure levels of proteins

CO3: Explain the significance of hydrophobic and hydrophilic forces for the structure of biomolecules and give examples thereof.

CO4: Explain the significance of steric effects for the structure of biomolecules and give examples thereof.

CO5: Outline and exemplify the relation between structure and function of biomolecules.

CO6: Draw the basic structure of carbohydrates, nucleic acids, peptides/proteins and lipids.

CO7: Name the functional groups in carbohydrates, nucleic acids, peptides/proteins and lipids.

CO8: Name heterocyclic rings.

CO9: Sketch common chemical and enzymatic reactions for functional groups and heterocyclic rings.

CO10: Be familiar with the principles in chemical syntheses of nucleic acids and peptides.

CO11: Use nomenclature from stereochemistry on biomolecules.

Paper-XII: Bio techniques

After completion of course, students will be able to:

CO1: Understand of practical techniques used in biotechnology, including background information and theory, applications, limitations, advantages and disadvantages, common problems and troubleshooting.

CO2: Understand fundamental biochemical calculations.

CO3: Demonstrate an understanding of the principles behind searching, finding and evaluating pertinent scientific information.

CO4: Understand the structure, format and principles of writing in a technical scientific method.

CO5: Understand awareness of current events in biotechnology and their financial, social and ethical implications.

B.Sc. Biotechnology S.Y. (III semester) Paper-XIII: Basics of immunology

After completion of course, students will be able to…..

CO1: Conceptualize the coordination of adaptive immune responses coordinate for fighting against pathogens.

CO2: Determine immunomodulatory strategies those can be used to enhance immune responses or suppress unwanted immune responses such as hypersensitivity reactions, transplantations or autoimmune diseases.

CO3: Review critically the sample literature to determine the strengths and weaknesses of the data published in immunology and its novelty.

CO4: Explore strategies to improve existing vaccines.

Paper-XIV: General Virology

After completion of the course, students will be able to….

CO1: Describe elements of the viral life cycle.

CO2: Explain viral replication strategies and compare replication mechanisms used by viruses relevant for human diseases.

CO3: Explain host antiviral immune mechanisms.

CO4: Describe viral strategies to evade host immune and cellular factors.

CO5: Discuss principles of virus pathogenesis.

CO6: Describe methods used for laboratory diagnosis of viral infections.

CO7: Explain vaccine strategies and mechanisms of antiviral drugs.

CO8: Coherently report outcomes of biological research.

Paper-XV: Developmental Biology

After completion of the course, students will be able to…..

CO1: Understand the process of animal development.

CO2: Understand the process of early embryonic development.

CO3: Understand the process of morphogenesis & organogenesis in animals.

CO4: Understand the cell death and regeneration.

Paper-XVI: Chromosome structure and inheritance

After completion of course, students will be able to….

CO1: Describe how cellular information is relayed and the process of genetic replication is undertaken in cells.

CO2: Demonstrate an understanding of the basic concepts of genetics, including Mendelian genetics, DNA and chromosome structure and gene expression and apply the knowledge to real life problems and case studies.

CO3: Solve simple problems arising from changes in genetic and biochemical processes at the cellular level, especially as these may relate to the activities of whole organisms.

CO4: Defend an opinion on ethical issues related to controversial procedures, and offer informed comment on current views and hypotheses dealing with cell level biology and biotechnology.

Paper-XVII: Basics of enzymology

After completion of course, students will be able to…..

CO1: Understand the major classes of enzyme and their functions in the cell.

CO2: Role of co-enzyme cofactor in enzyme catalyzed reactions

CO3: Differentiate between equilibrium and steady state kinetics and analyze simple kinetic data and estimate important parameters (Km. Vmax, Kcat etc).

CO4: To define and describe the properties of enzymes and regulate biochemical pathways (inhibition, allosterism).

Paper-XVIII: Animal Physiology

After completion of the course, students will be able to……

CO1: Understand the physiological processes that regulate body functions and the regulation of an organ system from the molecular all the way to the whole animal level.

CO2: Describe interactions among different organ systems (homeostasis).

CO3: Understand the anatomy of different physiological systems and their specific functions.

CO4: Understand impact of one system on another.

CO5: Apply knowledge of a physiological mechanism to explain whole animal physiological processes.

Paper-XIX: Cell Biology

After completion of course, students will be able to understand …..

CO1: Basic chemical composition of living matter.

CO2: Structural characteristics of prokaryotic and eukaryotic cells.

CO3: Taxonomy and characteristics of the major kingdoms.

CO4: Mechanics of membrane transport.

CO5: Basic concepts of bioenergetics, photosynthesis, and cellular respiration.

CO6: Mechanics of cellular reproduction.

CO7: Mendelian genetics and genetic change.

CO8: Nucleic acids and basic concepts of protein synthesis and gene .

Paper-XX: Plant physiology

After completion of course, students will be able to…..

CO1: Understand metabolism, physiology and structure of plants.

CO2: Understand regulation of growth and development of plants.

CO3: Understand influence of environment of plants.

Paper-XXI: Genetics

After completion of course, students will be able to…..

CO1: Comprehend the chemical basis of heredity.

CO2: Comprehend and understand the of genetic methodology.

CO3: Understand how genetic concepts affect broad societal issues including health and disease, food and natural resources, and environmental sustainability.

CO4: Understand the role of genetic mechanisms in evolution.

CO5: To provide an overview of heritable traits in families and populations and insights into cellular and molecular mechanisms.

Paper-XXII: Central dogma

After completion of course, students will be able to…..

CO1: Differentiate among the three kinds of RNA in terms of structure and functions.

CO2: Understand the codes present in the nucleotide sequence of DNA.

CO3: Describe the process of transcription, its machinery, and end products.

CO4: Describe the process of translation, its machinery, and end products.

CO5: Understand how specific amino acids are added to the proper tRNAs.

CO6: Describe the process of protein synthesis.

CO7: Understand the concept of transcription, translation, and protein synthesis and their relation.

CO8: Know the differences between prokaryotic and eukaryotic protein synthesis.

CO9: Understand why eukaryotic gene transcripts must be spliced.

Paper-XXIII: Advanced enzymology

After completion of course, students will be able to……

CO1: Understand the theories of enzyme catalytic power.

CO2: Understand the relationship between 3D enzyme structure and catalytic and kinetic properties.

CO3: Understand the diversity of catalytic strategies.

CO4: Possess the knowledge about enzymes' application in recent biotechnology.

Paper-XXIV: Advanced Immunology

CO1: To have a detailed understanding of lymph node microanatomy and know how B and T cells encounter antigen and develops in different locations.

CO2: To know antigen expression and autophagy on molecular level.

CO3: To understand immunology of mucosal surfaces and the interplay between commensal flora and the immune system in the gut.

CO4: To understand the cellular and molecular basis for autoimmune disease and allergies.

CO5: To understand tumor immunology and the development of novel recombinant antibodies for treatment of cancer and autoimmune disease.

CO6: To acquire in depth knowledge of a relevant research article and present this for the group.

Paper-XXV: Regulation of gene expression

After completion of course, students will be able to……

CO1: Explain the mechanism of initiation of transcription in eukaryotic cells.

CO2: Illustrate methods to identify key regulatory elements within a eukaryotic promoter.

CO3: Explain how transcriptional control is achieved through alterations in chromatin structure.

CO4: Outline the mechanisms of achieving the post-transcriptional control.

CO5: Explain the structure, formation and function of micro RNAs.

CO6: Outline the mechanisms and factors that control the process of translation.

CO7: An ability to critically evaluate and discuss original research articles in the area of gene regulation.

Paper-XXVI: Introduction to Bioinformatics

After completion of course, students will be able to….

CO1: Have a deep understanding of awareness of the basic principles and concepts of biology, computer science and mathematics.

CO2: Extract information from large databases and to use this information in computer modeling.

CO3: Solve enhance problem-solving skills, including the ability to develop new algorithms and methods of analysis.

CO4: Understand the intersection of life and information sciences, the core of shared concepts, language and skills the ability to speak the language of structure-function relationships, information theory, gene expression, and database queries.

Paper-XXVII: Principles of genetic engineering

After completion of course, students will be able to…..

CO1: Understand versatile techniques in recombinant DNA technology.

CO2: Understand application of genetic engineering techniques in basic and applied experimental biology.

CO3: Acquire proficiency in designing and conducting experiments involving genetic manipulation.

Paper-XXVIII: Fermentation design and process

After completion of course, students will be able to…..

CO1: To understand the different concepts of fermentation.

CO2: To know the differences between aerobic and aerobics fermentation and the classification of microorganisms.

CO3: To understand the growth of micro-organisms.

CO4: Isolate and identify micro-organisms from fermenting fruits, cereals and milk.

CO5: Design a simple containment system (bioreactor/fermenter).

Paper-XXIX: Plant Tissue Culture

After completion of course, students will be able to….

CO1: Explain the various steps taken to establish and optimize media for particular purposes in particular species.

CO2: Explain different components of plant tissue culture media.

CO3: Explain various cell lines used in tissue culture, their origins and uses.

Paper-XXX: Clinical Biochemistry

After completion of course, students will be able to….

CO1: Assess clinically laboratory indicators of physiologic conditions and diseases.

CO2: Know the biochemical and molecular tools needed to accomplish preventive, diagnostic, therapeutic intervention on hereditary and acquired disorders.

Paper-XXXI: Genomics and Proteomics

After completion of course, students will be able to…..

CO1: Infer the basic concepts of genomics, transcriptomics and proteomics.

CO2: Enlist and discuss the use of genomics and proteomics in human health.

CO3: Suggest and outline solution to theoretical and experimental problems in genomics and proteomics fields.

Paper-XXXII: RDT

After completion of course, students will be able to…..

CO1: To illustrate creative use of modern tools and techniques for manipulation and analysis of genomic sequences.

CO2: To expose students for application of recombinant DNA technology in biotechnological research.

CO3: To train students in strategizing research methodologies and employing genetic engineering techniques.

Paper-XXXIII: Fermentation Technology

After completion of course, students will be able to…..

CO1: Understand the various concepts of fermentation.

CO2: Know the differences between aerobic and aerobics fermentation and the classification of micro-organisms.

CO3: Understand the growth of micro-organisms.

CO4: Isolate and identify micro-organisms from fermenting fruits, cereals and milk.

CO5: Design a simple containment system.

Paper-XXXIV: Bioethics

After completion of course, students will be able to…..

CO1: Identify the historical forces that have contributed to the current global systems and consequences for humanity and/or the environment.

CO2: Explain how the theoretical approaches of the social sciences analyze and evaluate the impact of social class, race and/or gender on self and group identity and people's responses to diversity.

CO3: Communicate effectively the about major social and cultural trends of people living in non-western regions, particularly their religious patterns.

CO4: Critically integrate academic insights in global systems, social and cultural trends as well as theoretical approaches of the social sciences into coherent arguments in the field of global bioethics.

CO5: Perform research and write brief scholarly essays that present cogent arguments, engage in scholarly literature.

CO6: To enhance critical thinking and analytical skills regarding global bioethics.

Paper-XXXV: Ecology and evolution

After completion of course, students will be able to…..

CO1: Understand the structure and functions of ecosystem.

CO2: Understand population study.

Paper-XXXVI: Metabolism

After completion of course, students will be able to …..

CO1: Demonstrate and understand metabolic pathways.

CO2: Understand disease related metabolic pathways.

M.Sc. Biotechnology Paper-I: Biomathematics and statistics

After completion of course, students will be able to…..

CO1: Apply basic statistical concepts commonly used in health and life sciences.

CO2: Use basic analytical techniques to generate results.

CO3: Interpret results of commonly used statistical analysis in written summaries.

CO4: Demonstrate statistical reasoning skills correctly and contextually.

Paper-II: Biomolecules and Bioenergetics

After completion of course, students will be able to….

CO1: Describe/recognize amino acid structures, their physical and chemical properties, and predict how their ionic charges change with pH.

CO2: Define primary, secondary, tertiary and quaternary structures in proteins and identify the types of interactions in each case.

CO3: Describe the chemical nature of enzymes and their functions in biochemical reactions.

CO4: Explain regulation of enzyme activity with changes in temperature, pH, and concentration.

CO5: Explain the mechanism of digestion of proteins, catabolism of amino acids and the urea cycle.

CO6: Enlist the essential and non-essential amino acids and describe the general strategies for amino acid synthesis.

CO7: Describe/recognize the structure of mono-, di-, and polysaccharides; their physical as well as chemical properties and their functions in living organisms.

CO8: Predict the products of chemical reactions of carbohydrates (acetal/hemiacetal formation or oxidation).

CO9: Describe the mechanism of carbohydrate digestion, glycolysis, glycogenesis, and glycogenolysis.

CO10: Describe/recognize lipid structures including lipids found in cell membranes and their transport across membranes.

CO11: Describe the process of fatty acid oxidation and synthesis as well as ketogenesis.

Paper-III: Microbiology

After completion of course, students will be able to:

CO1: Acquire, articulate, retain and apply specialized language and knowledge relevant to microbiology.

CO2: Acquire and demonstrate competency in laboratory safety in routine and specialized microbiological laboratory skills applicable to microbiological research or clinical methods, including accurately reporting observations and analysis.

CO3: Communicate scientific concepts, experimental results and analytical arguments clearly and concisely, both verbally and in writing.

CO4: Demonstrate engagement in the microbiology discipline through involvement in research or internship activities, the microbiology student association club and outreach or mentoring activities specific to microbiology.

Paper-IV: Inheritance biology

After completion of the course, students will be able to .....

CO1: Apply quantitative problem-solving skills to human genetics problems and issues.

CO2: Evaluate biological factors that influence human heredity.

CO3: Demonstrate ability to reason inductively and deductively with experimental data.

CO4: Explain the molecular and biochemical basis, diagnosis and treatment of genetic diseases.

CO5: Select and apply experimental procedures to genetic screening.

Paper-V: Molecular biology

After completion of course, students will be able to…..

CO1: Apply problem-solving skills to biological issues.

CO2: Write the results of an experimental study in a lab report.

CO3: Demonstrate their ability to reason both inductively and deductively with experimental information and data.

CO4: Explain the function, replication and evolution of genomes.

CO5: Select and apply experimental procedures to solve biological problems.

Paper-VI: Enzyme Technology

After completion of the course, students will be able to…..

CO1: Appreciate the suitability of enzyme biotechnology as a sustainable alternative to the chemical industry.

CO2: Understand applications of enzymes in varied industrial processes.

CO3: Justify the critical conditions involved in the selection of typical enzymes in industrial processes.

Paper-VII: Cell Biology

After completion of course, students will be able to…..

CO1: Describe cytological, biochemical, physiological and genetic aspects of cells, including cellular processes common to all cells, to all eukaryotic cells as well as processes in certain specialized cells.

CO2: Relate normal cellular structures to their functions.

CO3: Explain cellular processes and mechanisms that lead to physiological functions as well as examples of pathological state.

CO4: Apply modern cellular techniques to solve aspects of scientific problems.

CO5: Describe the intricate relationship between various cellular structures and their corresponding functions.

Paper-VIII: Basic immunology

After completion of course, students will be able to…..

CO1: Conceptualize how the innate and adaptive immune responses coordinate to fight invading pathogens.

CO2: Determine what immunomodulatory strategies can be used to enhance immune responses or to suppress unwanted immune responses such as might be required in hypersensitivity reactions, transplantations or autoimmune diseases.

CO3: Review critically the sample literature to determine the strengths and weaknesses of the data published in immunology and its novelty.

CO4: Explore strategies to improve existing vaccines.

Paper-IX: Applied immunology and virology

CO1: To understand lymph node microanatomy and know how B and T cells encounter antigen and develops in different locations.

CO2: To know antigen presentation and autophagy on a detailed molecular level.

CO3: To understand immunology of mucosal surfaces and the interplay between commensal flora and the immune system in the gut.

CO4: To have deep knowledge of the cellular and molecular basis for autoimmune disease and allergies.

CO5: To have basic knowledge of tumor immunology and the development of novel recombinant antibodies for treatment of cancer and autoimmune disease.

CO6: To explain vaccine strategies and mechanisms of antiviral drugs, coherently report outcomes of virological research in oral and written output.

CO7: To gain in depth knowledge of a relevant research article and present this for the group.

CO8: To describe elements of the viral life cycle.

CO9: To explain viral replication strategies and compare replication mechanisms used by viruses relevant for human disease.

CO10: To explain host antiviral immune mechanisms.

CO11: To describe viral strategies to evade host immune and cellular factors.

CO12: Discuss principles of virus pathogenesis; describe methods used for laboratory diagnosis of viral infections.

Paper-X: Gene expression and engineering

After completion of course, students will be able to…..

CO1: Explain the mechanism of transcription initiation in eukaryotic cells.

CO2: Illustrate methods to identify key regulatory elements within a eukaryotic promoter.

CO3: Explain how transcriptional control is achieved through alterations in chromatin structure and methylation.

CO4: Outline the mechanisms by which post-transcriptional control is achieved.

CO5: Explain the structure, formation and function of micro RNAs.

CO6: Outline the mechanisms and factors that control the translation.

CO7: To evaluate critically and discuss original research articles in the area of gene regulation.

Paper-XI: Developmental biology

After completion of course, students will be able …..

CO1: To understand the process of animal development.

CO2: To know the process of early embryonic development.

CO3: To understand the process of morphogenesis & organogenesis in animals.

CO4: To study the cell death and regeneration.

Paper-XII: Bioinstrumentation

After completion of course, students will be able …..

CO1: To understand safety measures in laboratory, handling and care of instruments.

CO2: To determine pKa and prepare standard solutions.

CO3: To understand monochrome staining, negative staining and Gram ´s staining.

CO4: To understand biochemical test, specific gravity and viscosity.

Paper-XIII: Industrial technology

After completion of course, students will be able to …..

CO1: Have a working knowledge of business practices in industry.

CO2: Convey good people and communication skills.

CO3: Demonstrate knowledge of common practices of employer and employee relationships.

Paper-XIV: RDT

After completion of course, students will be able to…..

CO1: To illustrate creative use of modern tools and techniques for manipulation and analysis of genomic sequences.

CO2: To expose students to application of recombinant DNA technology in biotechnological research.

CO3: To train students in strategizing research methodologies employing genetic engineering techniques.

Paper-XV: Tissue technology

After completion of course, students will be able to …..

CO1: Explain the various steps taken to establish and optimize media for particular purposes.

CO2: Explain the components of plant tissue culture media.

CO3: Explain various cell lines used in tissue culture, their origins and uses.

Paper-XVI: Bioinformatics

After completion of course, students will be able to …..

CO1: Understand the basic principles and concepts of biology, computer science and mathematics.

CO2: Extract information from large databases and to use this information in computer modeling.

CO3: Acquire problem-solving skills, including the ability to develop new algorithms and analysis methods.

CO4: Understand of the intersection of life and information sciences, the core of shared concepts, language and skills the ability to speak the language of structure-function relationships, information theory, gene expression, and database queries.

COs: Bioinformatics

B.Sc. Bioinformatics Paper No. I -Basic Biophysics-I

After completion of the course, students will be able to …..

CO1: Demonstrate a thorough comprehension of the core concepts of classical and modern physics ("concepts").

CO2: Communicate effectively physics content through both written reports and oral presentation ("scientific communication").

CO3: Assess the validity of physical theories through the design and execution of an experiment, analysis of uncertainties associated with the measurement of data and interpretation of the data to draw valid scientific conclusions ("lab skills").

CO4: Solve physics problems using the appropriate methods in mathematical, theoretical and computational physics ("problem solving").

CO5: Apply their physics experience and knowledge to analyze new physical situations ("applications").

Paper No II- Fundamentals of Biology-I

After completion of course, students will be able to understand…..

CO1: Classification of organisms (Binomial system).

CO2: Five kingdom classification.

CO3: Bacterial diversity.

CO4: Plant development and plant hormones

CO5: Animal structure and function.

CO6: Origin of life.

Paper No-III- Basic Chemistry-I

After completion of the course, students will be able to understand……

CO1: Importance of chemistry.

CO2: Molecular formula.

CO3: Atomic structure.

CO4: Quantum mechanical model of atom.

CO5: Chemical bonding & molecular structure.

CO6: Solutions and chemical kinetics.

CO7: Periodic table.

Paper No-IV-Basic Statistics & Mathematics –I

After completion of course, students will be able to acquire…..

CO1: Versatility to work effectively in a broad range of analytic, scientific, government, financial, health, technical and other positions.

CO2: A broad background in mathematics and statistics, an appreciation of how it's various sub-disciplines are related, ability to use techniques from different areas, and an in-depth knowledge about topics chosen from those offered through the department.

CO3: Logic and critical thinking ability.

Paper No-V-Basics of Computers

After completion of course, students will be able…..

CO1: To understand the meaning and basic components of a computer system,

CO2: To define and distinguish hardware and software components of computer system,

CO3: To explain and identify different computing machines during the evolution of computers.

CO4: To gain knowledge about five generations of computer system,

CO5: To explain the functions of a computer,

CO6: To identify and discuss the functional units of a computer system,

CO7: To identify the various input and output units and explain their purposes.

CO8: To understand the role of CPU and its components,

CO9: To understand the concepts and need of primary and secondary memory,

CO10: To discuss the advantages, limitations and applications of computers.

CO11: To understand the classification of computers.

Paper No-VI-Introduction to Cell Biology

After completion of the course, students will be able to know…..

CO1: Definition of cell, cell theory, diversity of cell size and shape.

CO2: Structure and organization of prokaryotic and eukaryotic cells.

CO3: Different cell organelle.

CO4: Plasma membrane.

CO5: Transport across membranes.

Paper -VII – Basic Biophysics-II

After completion of the course, students will be able to understand…..

CO1: Types of waves.

CO2: Laws of thermodynamics.

CO3: Electricity.

CO4: Magnetic field.

CO5: Electromagnetic waves.

CO6: Optics & Light.

Paper -VIII – Fundamentals of Biology-II

After completion of the course, students will be able to know…..

CO1: introduction & history of microbiology.

CO2: Concept of sterilization.

CO3: Stains and staining techniques.

CO4: Microbes in extreme environment.

CO5: Basic concepts of virology.

Paper No-IX Basic Chemistry-II

After completion of the course, students will be able to understand…..

CO1: Stereochemistry and basis of organic reaction mechanisms.

CO2: Hydrocarbons.

CO3: Alcohols, phenols, aldehydes, ketones, carboxylic acids in biology.

CO4: Heterocyclic & polymer chemistry.

Paper No-X-Basic Statistics & Mathematics- II

After completion of the course, students will be able to know…..

CO1: Introduction to probability.

CO2: ANOVA & MANOVA.

CO3: Limit & continuity.

CO4: Derivatives.

CO5: Concept of integration, its types and applications.

Paper No-XI-Programming in C/C^{++}

After completion of the course, students will be able to …..

CO1: Perform object oriented programming to develop solutions to problems, demonstrating usage of control structures, modularity, I/O. and other standard language constructs.

CO2: Demonstrate adeptness of object oriented programming in developing solutions to problems demonstrating usage of data abstraction, encapsulation, and inheritance.

CO3: Demonstrate ability to implement one or more patterns involving realization of an abstract interface and utilization of polymorphism in the solution of problems which can take advantage of dynamic dispatching.

Paper No-XII-Introduction to Genetics

After completion of course, students will be able to…..

CO1: Describe the fundamental molecular principles of genetics.

CO2: Understand the structure and function of DNA, RNA and protein.

CO3: Explain the genes code for proteins.

CO4: Understand the relationship between phenotype and genotype in human genetic traits.

CO5: Describe the basics of genetic mapping.

B.Sc. Bioinformatics S.Y. (III semester) Paper No XIII - Biomolecules.

After completion of course, students will be able to understand …..

CO1: Elements present in biomolecules and the difference between monomers and polymers.

CO2: Role of water in synthesis and breakdown of polymers.

CO3: Major complex biomolecules found in living cells.

CO4: Learn for each group of biomolecules, the name of generic monomer (simple unit) and polymer (complex structure) and their functions.

Paper No XIV-Database management system

After completion of the course, students will be able to ….

CO1: Enlist and explain the fundamental concepts of a relational database system.

CO2: Utilize a wide range of features available in a DBMS package.

CO3: Analyze database requirements and determine the entities involved in the system and their relationship.

CO4: Develop logical design of the database using data modeling concepts such as entity-relationship diagrams.

CO5: Create a relational database using a relational database package.

CO6: Manipulate a database using SQL.

CO7: Assess the quality and ease of use of data modeling and diagramming tools.

Paper No XV- Molecular structure & Enzyme kinetics

After completion of the course, students will be able to know…..

CO1: Aspects of protein structure from genome to proteome.

CO2: Enzyme kinetic behavior and mechanisms.

CO3: Chromatin structure in relation to gene expression.

Paper No XVI- Basic techniques in Biology

After completion of the course, students will be able …..

CO1: To understand purification and separation techniques for biomolecules.

CO2: To understand the UV spectrophotometry.

CO3: To understand the basics of chromatography techniques.

Paper No XVII-Object oriented programming in JAVA

After completion of the course, students will be able to…..

CO1: Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.

CO2: Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.

CO3: Be aware of the principles of software development.

CO4: Have the ability to write a computer program to solve specified problems.

CO5: Be able to use the Java SDK environment to create, debug and run simple Java programs.

Paper No XVIII- Introduction to Bioinformatics

After completion of the course, students will be able to…..

CO1: Describe contents and properties important bioinformatics databases.

CO2: Explain major steps in pairwise and multiple sequence alignment.

CO3: Predict the secondary and tertiary structures of protein sequences.

CO4: Explain the principle for and execute pairwise sequence alignment by dynamic programming.

CO5: Perform text- and sequence-based searches and analyze them.

CO6: Discuss results of experiments in light of molecular biological knowledge.

B.Sc. Bioinformatics S.Y. (IV semester)

Paper No XIX- Metabolism

After completion of the course, students will be able to …..

CO1: Understand the fundamental energetics of biochemical processes.

CO2: Understand the chemical logic of metabolic pathways.

CO3: Recognize and understand basic mechanisms of pathway regulation.

CO4: Understand the relation between biochemical defects and metabolic disorders.

CO5: Understand the integration of metabolic processes in cellular systems.

CO6: Understand the organization of signaling pathways.

CO7: Familiarize with core metabolic pathways.

CO8: Understand metabolic basis of cancer, diabetes and other diseases.

Paper No XX- Introduction to Data structure and algorithm

After completion of the course, students will be able to enhance ……

CO1: Ability to analyze algorithms and algorithm correctness.

CO2: Ability to summarize searching and sorting techniques.

CO3: Ability to describe stack, queue and linked list operation.

CO4: Ability to have knowledge of tree and graphs concepts.

Paper No XXI-Central dogma

After completion of the course, students will be able to …..

CO1: Utilize their understanding of nucleic acid structure to explain the basis of recombinant DNA technology.

CO2: Familiarize with the primary literature.

CO3: To evaluate critically the use of techniques to address specific experimental problems.

CO4: Aware of social issues raised by the application of molecular genetics in modern society.

Paper No XXII-Advanced JAVA

After completion of course, students will be able to …..

CO1: Develop swing-based GUI.

CO2: Develop client/server applications and TCP/IP socket programming.

CO3: Update and retrieve data from the databases using SQL.

CO4: Develop distributed applications using RMI.

CO5: Develop component-based Java software using JavaBeans.

CO6: Develop server side programs in the form of servlets.

Paper No XXIII- Introduction to chemo informatics

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

CO1: Molecular modeling

CO2: Pharmaceutical research

CO3: Introduction to medical chemistry

CO4: Computer assisted virtual screening

CO5: Library designing

Paper No XXIV-Genomics & Proteomics

After completion of the course, students will be able to understand …..

CO1: Subject genomics, proteomics and their applications.

CO2: Organization of a large amount of information and offer basic knowledge of genome sequencing, major differences between prokaryotic and eukaryotic genomes, basic proteomics and its applications, basics of bioinformatics, comparative and evolutionary genomics and applications.

CO3: Skills for working with core facilities and commercial biological laboratories.

CO4: Genomes, proteomes and databases that store data about genes, proteins, genomes and proteomes.

B.Sc. Bioinformatics T.Y. (V semester) Paper-XXV- RDT & Molecular

After completion of the course, students can…..

CO1: Work independently in a laboratory.

CO2: Read scientific articles and gain a critical understanding.

CO3: Give a spoken and written presentation of scientific topics and research results.

CO4: Present hypotheses, select, adapt and conduct molecular and cell-based experiments to either confirm or reject the hypotheses.

Paper-XXVI-Immunology

After completion of the course, students will be able to …..

CO1: Communicate effectively immunological response mechanisms, their response and regulation on genetic basis.

CO2: Apply scientific principles in the interpretation of immunological responses and data.

CO3: Apply an understanding of the roles of immunology in protection against disease and autoimmune disorders to choices in their daily lives.

Paper-XXVII- Gene Expression & Flow processing

After completion of the course, students will be able to…..

CO1: Understand the typical flow of genetic information in a cell.

CO2: Understand how DNA and RNA direct transcription and translation.

CO3: Understand the importance of controlling gene expression.

CO4: Understand how mutations affect the process of protein synthesis.

Paper-XXVIII- Bioinformatics methods

After completion of the course, students will be able to …….

CO1: Understand the data available from the most common protein sequence and structure databases (UniProt, GenBank, Protein Data Bank, CATH).

CO2: Explain theories underlying the most common methods for sequence searches and sequence alignments.

CO3: Explain and apply the main steps of dynamic programing for simple alignments of short sequences.

CO4: Identify methods to uncover structure-function relationship in proteins and the underlying principles.

Paper-XXIX- Introduction to LINUX

After completion of the course, students will be able to…..

CO1: Identify and use UNIX/Linux utilities to create and manage simple file processing operations, organize directory structures with appropriate security, and develop shell scripts to perform more complex tasks.

CO2: Use effectively UNIX/Linux system to accomplish typical personal, office, technical, and software development tasks.

CO3: Monitor system performance and network activities.

CO4: Use software development tools including libraries, preprocessors, compilers, linkers, and make files.

CO5: Comprehend technical documentation, prepare simple readable user documentation and adhere to style guidelines.

CO6: Collaborate in teams on system tasks.

Paper-XXX- Introduction to PERL & Julia

After completion of the course, students will be able to …..

CO1: Describe the fundamental data types for Perl.

CO2: Create and access arrays.

CO3: Program with branching and looping constructs.

CO4: Create and access hashes.

CO5: Input from the keyboard.

CO6: Output from the screen.

CO7: Utilize regular expressions with Perl.

CO8: Create and use functions.

B.Sc. Bioinformatics T.Y. (VI semester) Paper-XXXI - Introduction to Python & R

After completion of the course, students will be able …..

CO1: To understand necessity of python as a scripting language for developers.

CO2: To learn the design and program using python applications.

CO3: To learn use of lists, tuples, and dictionaries in python programs.

CO4: To identify python object types.

CO5: To use indexing and slicing to access data in python programs.

CO6: To define the structure and components of a python program.

CO7: To write loops and decision statements in python.

Paper-XXXII- Genomes to drug and vaccine

After completion of the course, students will be able to understand…..

CO1: Genome assembly

CO2: Organization of data in database

CO3: Basic aspects of genome annotation

CO4: Identification of drug target

CO5: Protein sequence analysis and epitope prediction

Paper-XXXIII- Algorithms for bioinformatics

After completion of the course, students will be able to ….

CO1: Align two sets of sequences using both a global and local alignment approach.

CO2: Explain the effect of changing parameters such as scoring matrices, gap penalties etc.

CO3: Interpret the output of a pairwise alignment.

CO4: Identify the appropriate use of global or local alignment method.

Paper-XXXIV- Structural bioinformatics

After completion of the course, students will be able to …..

CO1: Familiarize with algorithms and data collections in structural bioinformatics.

CO2: Understand the computational methods used in protein modeling, docking, and other areas of structural bioinformatics.

CO3: Write programs to analyze protein structure data.

CO4: Use software packages for macromolecular structure analysis, modeling and docking.

CO5: Apply structural bioinformatics that are directed towards understanding and predicting biological functions.

Paper-XXXV- Object oriented and relational databases

After completion of the course, students will be able to….

CO1: Know the basics of database system concepts and architecture.

CO2: Understand entity relation.

CO3: Understand the rational model, algebra, calculus, ER- and EER-to-rational mapping.

CO4: Understand functional dependencies and normalization.

CO5: Understand query processing and optimization.

Paper-XXXVI- Introduction to Python & R

After completion of the course, students will be able …..

CO1: To understand string methods in Python and R.

CO2: To use R for statistical calculations.

CO3: To visualize data and understand results of statistical calculations.

M.Sc. Bioinformatics

First year First semester

BI 401 Basic Biology, Mathematics and Statistics

After completion of the course, students will be able to …..

CO1: Understand versatility to work effectively in a broad range of analytic, scientific, government, financial, health, technical and other positions.

CO2: Understand background in mathematics and statistics.

CO3: Apply reasoning, including the ability to abstract from concrete situations and make ideas precise by formulating them mathematically or statistically.

CO4: Analyze, test, and interpret technical arguments, and form independent judgments.

CO5: Enhance problem solving.

CO6: Solve complex problems by identifying feasible divisions into simpler sub-problems; gather and organize relevant qualitative and quantitative information including problems, examples and counter examples; sharpen and/or focus mathematical or statistical questions as a problem solving strategy.

CO7: Understand classification of organism (Binomial system).

CO8: Understand bacterial diversity.

CO9: Understand plant development and plant hormones.

CO10: Understand animal structure and function.

CO11: Understand the origin of life.

BI 402 Biological Chemistry and Genetic information flow & processing

After completion of the course, students will be able to understand …..

CO1: Structure and function of DNA, RNA and protein.

CO2: Genetic codes for proteins.

CO3: Basics of genetic mapping.

CO4: Working independently in a laboratory.

CO5: Scientific articles and gain a critical understanding of their contents.

CO6: Relationship between phenotype and genotype in human genetic traits.

CO7: Presentation of hypotheses, selection, adaptation and conducting of molecular and cell-based experiments.

CO8: Typical flow of genetic information in a cell.

CO9: DNA and RNA transcription and translation.

CO10: Importance of controlling gene expression.

403 Basic concepts in computing and introduction to database systems

After completion of the course, students will be able to ……

CO1: Understand the basic components of a computer system.

CO2: Recognize the five generations of computer system and explain the functions of a computer.

CO3: Identify the inputs / output units and explain their purposes.

CO4: Understand the role of CPU and its components, understand the concept and need of primary and secondary memory, discuss the advantages, limitations and applications of computers.

CO5: Enlist and explain the fundamental concepts of a relational database system.

CO6: Utilize a wide range of features available in a DBMS package.

CO7: Analyze database requirements and determine entities involved in the system and their relationship.

CO8: Develop logical design of the database using data modeling concepts.

CO9: Create a rational database.

CO10: Manipulate a database using SQL.

CO11: Distinguish between hardware and software components of computer system.

CO12: Identify different computing machines during the evolution of computer system.

404 Biological databases and Data Analysis

After completion of the course, students will be able to …..

CO1: Describe the contents and properties of the most important bioinformatics databases, perform text- and sequence-based searches, and analyze and discuss the results in light of molecular biological knowledge.

CO2: Explain major steps in pairwise and multiple sequence alignment.

CO3: Predict the secondary and tertiary structures of protein sequences.

CO4: Explain the type of data available from the most common protein sequence and structure databases (UniProt, GenBank, Protein Data Bank, CATH).

CO5: Explain the theories underlying the most common methods for sequence searches and sequence alignments.

CO6: Explain and apply the main steps of dynamic programing to simple alignments of short sequences.

CO7: Execute pairwise sequence alignment by dynamic programming.

Semester: II BI 405 Cell Biology and Immunology

After completion of the course, students will be able to understand…..

CO1: Basics of cell, cell theories, diversity of cell size and shape.

CO2: Structure and organization of prokaryotic and eukaryotic cells.

CO3: Different cell organelle.

CO4: Plasma membrane.

CO5: Transport across membranes.

CO6: Communicate effectively in oral and written formats using appropriate vocabulary regarding the immunological response, mechanisms of this response, its regulation and the genetic basis.

CO7: Application of scientific principles in the interpretation of immunological responses and data.

CO8: Role of immunology in protection against disease and autoimmune disorders to choices in their daily lives.

406 Structural Biology

After completion of the course, students will be able to…..

CO1: Familiar with algorithms and data collections.

CO2: Understand computational methods used in protein modeling, docking, and other areas of structural bioinformatics.

CO3: Write programs to analyze protein structure data.

CO4: Use software packages for macromolecular structure analysis, modeling and docking.

CO5: Use applications of structural bioinformatics that are directed towards understanding and predicting biological functions.

407 Chemo Informatics and Biodiversity Informatics

After completion of course or paper student will be able to understand…..

CO1: Molecular modeling.

CO2: Pharmaceutical research.

CO3: Introduction to medical chemistry.

CO4: Computer assisted virtual screening.

CO5: Library designing.

408 Programming in object oriented languages, Computer Graphics, Networking and data security

After completion of the course, students will be able to …..

CO1: Understand fundamentals of programming such as variables, conditional execution, methods, etc.

CO2: Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries.

CO3: Understand important topics and principles of software development.

CO4: Write a computer program for solving specified problems.

CO5: Use the Java SDK environment to create, debug and run simple Java programs.

III Semester

501 Taxonomy & Phylogeny

After completion of the course, students will be able to …..

CO1: Understand the concepts in systematics, classical taxonomy and phylogeny in the viral, microbial, animal and plant universe, basis for classification, nature of characteristic properties used for the same.

CO2: Understand the concepts of molecular evolution and the nature of data for deriving molecular phylogeny.

CO3: Understand the statistical approaches and models that can be used for phylogenetic analysis and tree reconstruction.

CO4: Understand the computational approaches for phylogenetic analysis and their applications.

BI 502 Object Oriented and Relation Databases

After completion of the course, students will be able to understand…..

CO1: Database system concepts and architecture

CO2: Entity relation

CO3: Rational model, algebra, calculus, ER- and EER-to-rational mapping

CO4: Functional dependencies and normalization.

CO5: Query processing and optimization.

BI 503 Genomics, Proteomics and Genome to Drug and Vaccine

After completion of the course, students will be able to …..

CO1: Appreciate and understand changes in the approaches for computational analysis between the pre- and post-genomic era.

CO2: Understand the role of bioinformatics in the genome sequencing process and post genomic analyses for gene identification.

CO3: Appreciate the role of bioinformatics in post-genomic technologies and areas such as DNA micro-array experiments, proteomics, protein-protein interactions, pharmacogenetics, identification of disease genes, drug and vaccine design.

CO4: Appreciate the genome comparisons and understand the algorithms used for comparisons of full genome and gene order.

CO5: Understand and appreciate the full genome comparative studies viruses, microbes, pathogens and eukaryotes.

CO6: Understand and explore the comparative genomic databases, understand the concepts of SNPs and their significance, and appreciate the proteomics concepts and technology.

CO7: Understand the basis and nature of protein-probe in interactions and related databases.

CO8: Use genome comparison, structural and functional elucidation of genomes and drug target identification.

BI 504 Parasite Bioinformatics

After completion of the course, students will be able to ……

CO1: Understand life cycles and biology of selected parasites as well as their interactions with the host and vector.

CO2: Understand the role of bioinformatics in combating parasitic diseases through parasite-specific databases and analysis of genomic, proteomic data.

CO3: Appreciate the need and approaches for novel drugs/vaccines for parasitic diseases in the context of multidrug resistance.

BI 505 Advanced Techniques for Sequence and Structure Analysis and Data Mining

After completion of the course, students will be able ……

CO1: To understand and implement advanced mathematical, physical and statistical techniques.

CO2: Analyze information at sequence and structure level.

BI 506 Metabolites and Metabolic Pathway Engineering.

After completion of the course, students will be able to …..

CO1: Learn the fundamental biochemical concepts of metabolic pathways.

CO2: Understand the role of bioinformatics in the study of metabolic pathways.

CO3: Learn the bioinformatics-based approaches for predicting and engineering metabolic pathways.

BI 507 Emerging Areas in Bioinformatics

CO1: After completion of course or paper student will be able to know the recent developments in life sciences in the context of bioinformatics. .

B. Voc. Bio product technician

BPT101: Basic Biology

Students will be able to …..

CO1: Explain the basic concepts in biology.

CO2: Acquire skills to function as a biologist in workplace.

CO3: Demonstrate ability to articulate, verbally and in writing knowledge of biological methods and biological issues in context.

CO4: Read, understand and critically interpret the primary biological literature

CO5: Design, conduct, analyze and communicate biological research.

BPT102: Basic computing and electronics

Learners will be able to ……

CO1: Understand the main components of OS and their functions.

CO2: Acquire core knowledge of network layer routing protocols and IP address.

CO3: Study various data transfer techniques in digital media.

CO4: Understand number representation and conversion between different representations in digital electronic circuits.

CO5: Describe the function of each layer in OSI and TCP/IP model

CO6: Describe and analyze memory management and its application policies.

CO7: Identify and compare different methods for computer I/O mechanism

CO8: Develop a digital logic and apply it to solve real life problems.

BPT103: Practical based on basic biology:

CO1: To acquire knowledge and develop understanding of biological principles, concepts, and facts.

CO2: To develop biological techniques and process skills.

CO3: To develop knowledge and understanding of natural world.

CO4: To learn use of scientific equipment and follow a standard practical procedure.

CO5: to develop understanding of scientific approach to enquiry.

BPT104: Basic chemistry-I

CO1: To acquire laboratory skills.

CO2: To understand mechanism used to predict the products of chemical reactions.

CO3: To learn and apply basic techniques used in organic laboratory for the preparation, purification and identification of organic compounds.

CO4: To develop ability to present scientific and technical information resulting from laboratory experiments in both written and oral formats.

CO5: To develop different purification techniques.

CO6: To design, conduct and interpret the chemical research.

Skill education component

BPT151: Analytical techniques

At the end of the course, learners will be able to…..

CO1: Understand scientifically the basic concepts in instrumentation used in bio-products.

CO2: Understand pH measurement, microscopy, colorimetry, electrophoresis, chromatography, centrifugation and flow cyclometry.

CO3: Understand basics of instruments, principles and working of common laboratory instruments.

Basic microbiology

BPT152: Basic microbiology

CO1: Students will be able to acquire specialized language and knowledge in relevant to microbiology.

CO2: Students will acquire and demonstrate their competency in laboratory safety in routine.

CO3: Students will be to understand microbes.

BPT153: Basic biochemistry

CO1: Students will be able to demonstrate an understanding of fundamental; biochemical principles such as the structure / function of biomolecules, metabolic pathways and the regulation of biological / biochemical processes.

CO2: Biochemistry measures will gain proficiency in basic laboratory techniques.

CO3: Students in biochemistry will be able to apply and effectively communicate scientific reasoning that data analysis in both written and oral forums.

BPT201: Basic Biology-II

CO1: Students will be able to evaluate scientific information regarding animal, plant physiology and molecular biology.

CO2: Students can use knowledge about organs, organ structure and different types to explain and describe the specialized functions and regulations of major organs and organ systems in the animal kingdom.

CO3: Leaners will be able to summarize scientific papers in the fields of animal and plant physiology.

BPT204: Basic computing and electronics-II

CO1: To have a basic knowledge of the use of operating systems and network security.

CO2: To understand the OSI reference model and in particular have a good knowledge of layers.

CO3: To manage multiple operating systems, system software, network services and security.

CO4: To understand computer network.

BPT204: Basic chemistry-II

CO1: Students will gain ability to perform various basic procedures in chemistry lab including weighing samples, titration and solution preparation

CO2: Students will gain ability to keep accurate and detailed records of experimental results.

CO3: Students will develop ability to present scientific and technical information resulting from laboratory experiments in both written and oral formats.

BPT251: Applied Thermodynamics

Upon successful completion of this course, students will be…..

CO1: Able to apply thermodynamic principles to bio-product technician.

CO2: Able to apply fundamental concepts to study the properties of steams, gas and gas mixtures.

CO3: Able to understand fundamentals of thermodynamics and perform thermal analysis behavior and performance.

BPT252: Applied Microbiology

CO1: Students will be able to select and use appropriate laboratory media for microorganisms of interest in safer and responsible manner.

CO2: Students will be able to grow, identify and count microorganisms.

CO3: Students will be able to understand the role of microorganisms in various fields.

CO4: Students can apply knowledge on concepts and fundamental principles of microbiology, key features of the structure, growth, physiology and behavior of bacteria, virus and protozoa.

CO5: Students can understand basic concepts in microbiological techniques applicable in laboratory.

BPT253: Fermenter design-I

CO1: To understand basic design of fermenter and its operations.

CO2: To understand design and working of fermenter.

BPT301-Biostatics

Students will be able to understand …..

CO1: Basics of statistics

CO2: Data collection and its presentation

CO3: Statistical measurements – terms and basic concepts

CO4: Correlation and regression analysis

CO5: Significance of V-test

BPT303-Plant breeding

After studying the course, students will be able to understand….

CO1: History and objectives of plant breeding.

CO2: Patterns of evolution and its significance.

CO3: Heritability and genetic advance, genotype-environment interactions, general and basic combining ability.

CO4: Gene action and implementation in plant breeding.

CO5: Plant genetic resources in plant breeding.

CO6: Special breeding techniques including mutation, breeding for biotic stresses.

BPT352-Upsteram process

Learners will be able to understand….

CO1: Screening of industrially important microorganisms.

CO2: Methods of strain development and mutation types.

CO3: Methods and protocols for selection of mutants.

CO4: Recombination techniques in bacteria, fungi and recombination in actinomytes.

CO5: Regulation of enzyme activity and synthesis.

CO6: Regulation and overproduction.

BPT401-Recombinant DNA technology

Students will be able to understand …..

CO1: DNA modification and cutting

CO2: Vectors used in rDNA technology

CO3: Techniques of cloning and sequencing

CO4: Molecular tools and applications

CO5: Methods of isolation, identification and characterization of DNA fragments.

BPT403-Plant Tissue culture

Students will be able to understand…..

CO1: Basics of plant tissue culture.

CO2: Methods used in plant tissue culture.

CO3: Applications of cell science.

CO4: Techniques of increased crop production.

BPT452-Downstream process-I

Learners will be able to understand…..

CO1: An overview of bio-separation, recovery of intracellular products and cell disrupt methods.

CO2: Applications of chemical and physical methods of cell disruption

CO3: Basics of chemical and enzymatic methods of downstream process

CO4: Techniques of cell separation

CO5: Basics of microfiltration and centrifugation

CO6: Isolation and purification - precipitation, leaching, adsorption, ultrafiltration and precipitation.

Semester V

BPT501: Bioprocess monitor and control

CO1: Students will be able to observe small changes in process that can have a large impact in the end result.

CO2: Students will be able to understand the variations in proportions, temperature, flow and many other factors which must be carefully and constituently controlled to produce the desired end products with a minimum of raw materials and energy.

CO3: Students will be able to understand the fundamentals of process control as applied to bioprocesses in industry

BPT502: Animal cell culture technology and transgenic animals

CO1: Students will learn to demonstrate foundational knowledge of cell culture techniques and competence in laboratory techniques.

CO2: Students are taught to have in depth knowledge of stem cells, their uses, and the clinical use of stem cell therapy

CO3: Students will understand the basic concepts of animal cell culture

CO4: Students will learn aseptic techniques involved in handling of animal cell culture.

CO5: To understand the type and environment of cell culture.

BPT503: Nutraceuticals

CO1: To describe the components of nutraceutical and functional food.

CO2: To evaluate the standard of evidence required for efficiency and safety assessment of nutraceuticals and functional food

CO3: To work effectively as group member on a specific problem

CO4: To understand the concept of functional foods

CO5: To familiarize students with examples of bioactive ingredient disease and importance of clinical study support.

BPT551: Growth energetics

CO1: Students understand the energetics of microbial growth.

CO2: Students will understand the concept of microbial growth and different aspects regarding growth kinetics.

BPT552: Bio simulators

CO1: To formulate the models of biological process

CO2: To acquire skills in system dynamic and system biology

CO3: To understand use of mathematical models and components in solving biological problems.

CO4: To enable students to simulate dynamic and biological processes.

BPT601: Supply chain and enterprise resource planning in bio-manufacturing

CO1: Students will be able to understand the supply chain, management of flow of materials.

CO2: Students will be able to understand the design, planning and supply chain of bio products.

BPT602: Methods in quality improvements, investigations and audits

Students will be able to…..

CO1: Improve the quality of bio-products and investigate the scientific methods as well a quality management systems.

CO2: Describe the history and background of quality improvement in health care and public health.

CO3: Summarize the most commonly used quality improvement in models.

CO4: Describe the effect of accreditation, regulation and public reporting on quality improvement.

BPT603: Bioethics and IPR

CO1: To identify historical fore that has contributed to the current global systems and its consequences for humanities and environments.

CO2: To explain how the theoretical approaches of social sciences analyze and evaluate the impact of social class, race and gender on self, group identify and peoples responses to diversity.

CO3: To summarize research and write brief scholarly essays that present cognitive arguments and engage scholarly literature and demonstrate critical thinking and analysis regarding global bioethics

BPT651 Documentation and record keeping:

CO1: To explain the necessity of maintaining excellent clinical / medical records / bio products records.

CO2: To understand responsibilities for maintaining good clinical records / bio products records.

CO3: To explain the constituents in documentation and maintaining record.

CO4: To understand the legal requirements for record keeping.

CO5: To understand know how long clinical records should be kept.

BPT652: Bioremediation technology

CO1: To learn the basic microbiology and understand to formulate biodegradation kinetics.

CO2: To demonstrate the understanding of nature and importance of bioremediation.

CO3: To understand bioremediation and applicable strategies.

CO4: To demonstrate the use of core concepts.

CO5: To solve problems in real world applications.

BPT653: Bioenergy production

CO1: To understand the renewable feedstock and their availability.

CO2: To understand techniques for biofuel production.

CO3: To understand the design processes for biofuel production.

CO4: To provide students with knowledge of tools and techniques necessary for biofuel operations.

CO5: To analyze and design the process for biofuel production.

COs: Geology

B.Sc. Geology

B. Sc. I year- Semester I Paper I. Mineralogy and Crystallography

CO1: To familiarize learners with basic concepts in minerals and crystals.

CO2: To acquire a good understanding of geology.

CO3: To describe the different physical properties for identifying minerals megascopically.

CO4: To study normal class of minerals belonging to the seven crystal systems.

B. Sc. I year- Semester I Paper II. General Geology and Structural Geology

After studying the course, learners will be able …..

CO1: To understand formation of the mineral resources.

CO2: To understand the origin and evolution of life on earth.

CO3: To understand the evolution of atmosphere, and causes of disappearance of organisms from the earth as a function of the varying environment.

CO4: To understand natural disasters such as volcanoes and earthquake.

B. Sc. I year- Semester II Paper IV. Petrology

After studying the course, learners will be able …..

CO1: To identify types of rocks and their study.

CO2: To understand different types of rocks such as igneous rocks, metamorphic rocks and sedimentary rocks.

CO3: To understand classification, forms, textures and structures of rocks.

CO4: To understand basic concepts in petrology.

B. Sc. I year- Semester II Paper V. Paleontology & Stratigraphy

CO1: To understand and identify different phyla such as Mollusca, Brachiopoda and Echinodermata.

CO2: To understand the principles of paleontology & stratigraphy.

CO3: To understand physiographical divisions of India and Maharashtra, time scale, code and various units.

CO4: To acquire knowledge of the past of the place where they study and belong to.

B.Sc. II year- Semester III Paper VII. Physical Mineralogy & Igneous Petrology.

After completing the course, students will be able …..

CO1: To identify the seven families of minerals such as silicates, pyroxenes, amphiboles etc. in details.

CO2: To understand minerals belonging to precious and semi-precious stones.

CO3: To understand the physiochemical constitution of magma with its crystallization, structures and microstructures.

B.Sc. II year- Semester III Paper VIII. Crystallography and Optical Mineralogy

CO1: To study crystallography in detail.

CO2: To understand crystals in detail.

CO3: To understand basics of optical mineralogy.

CO4: To understand different classes of crystals such as hemihedral, cubic and hexagonal system etc.

B.Sc. II year- Semester IV Paper XI. Sedimentary and Metamorphic Petrology.

CO1: To understand sedimentary rocks, their types, composition, formation, diagnosis and classification of rocks.

CO2: To understand metamorphic rocks, their formation, metamorphosis, and metasomatic properties.

CO3: To understand different rocks and types of metamorphic and sedimentary rocks in detail.

CO4: To study of the structures, roundness, and sphericity of the rocks.

CO5: to study structures and textures found in the sedimentary rocks.

B.Sc. II year- Semester IV Paper XII. Structural Geology & Paleontology.

CO1: To understand different structures such as planar, linear and all other outlier, inlier, folds, faults, joints, and unconformity.

CO2: To study micropaleontology and its application in stratigraphy.

CO3: To understand and identify plant fossils, index fossils, zonal guide fossils and morphology of different trilobites and other fossils.

B.Sc. III year- Semester V Paper XVII. Indian Geology

CO1: To understand stratigraphic units of the peninsular and extra peninsular India.

CO2: To understand distribution and classification of fossils.

CO3: To identify economic importance of Archaens, Cuddapah, Gondwana, and Siwalik.

B. Sc. III year- Semester V Paper XVI. Economic Geology.

CO1: To study magma as a source of mineral deposits.

CO2: To understand the processes of formation of mineral deposits such as the magmatic concentration, cavity filling deposits etc.

CO3: To understand the geological and geographical distribution of the mineral deposits such as iron, manganese, bauxite, lead, zinc, gold and other minerals.

B.Sc. III year- Semester VI Paper XIX. Applied Geology -1

CO1: To understand geophysical techniques of geo-prospecting such as geochemical, geophysical and geobotanical methods.

CO2: To understand remote sensing for well logging and subsurface mapping.

CO3: To understand engineering geology.

CO4: To understand methods of well logging and drilling.

B. Sc. III year- Semester VI Paper XX. Applied Geology-2.

CO1: To learn hydrology, hydrogeology and geohydrology.

CO2: To understand hydrological properties of rocks such as porosity, permeability, stativity and transmissivity.

CO3: To understand Darcy's law, occurrence of groundwater in igneous, metamorphic and sedimentary rocks, concept of water shed management, hydrochemical, hydrogeological characters and parameters.

M.Sc. Geology Paper CCGL101- Mineralogy and Crystallography

CO1: To familiarize students with the basics of minerals and crystals.

CO2: To acquire good understanding of geological concepts.

CO3: To understand physical, chemical and optical properties for identifying minerals megascopically.

CO4: To acquire a deep understanding of optical mineralogy such as birefringence, goniometry twinning etc.

Paper CCGL102- Paleontology & Stratigraphy

After completing the course, students will be able to understand…..

CO1: Rocks, their ages, faces, fossil content of the Paleozoic, Cenozoic and Mesozoic ages.

CO2: Origin and evolution of fossils, collection, preparation, preservation and maintenance of paleontological record.

CO3: Types of microfossils such as foraminifera and calcareous.

CO4: Trace fossils.

Paper CCGL103- Structural Geology and Tectonics

CO1: To study the properties of rocks and their controlling factors.

CO2: To understand stress and strain i.e. deforming forces, folds, faults, fractures and joints in structural geology.

CO3: To understand the dynamic evolution of continental and oceanic crust, formation of the mountains along with the anatomy of different belts of the world.

CO4: To understand seismicity of India.

Paper CCGL104 - Sedimentary Petrology

CO1: To understand formational procedures of the sedimentary rocks, their classification, textures and structures.

CO2: To understand petrofacies, paleoclimate and palaeoenvironment and their analysis.

CO3: to understand digenetic environments of carbonate minerals, carbonate grains and their biological origin.

CO4: To familiarize learners with marine environment.

Paper CCGL201- Igneous Petrology

CO1: To understand magma, its constitution, generation, source rock, composition and nature.

CO2: To study phase equilibrium of the components of magma and its genesis.

CO3: To deal with igneous rocks including composition, crystallization, and classification on the basis of Niggle values, CIPW- norms, and IUGS.

CO4: To study major igneous rocks.

Paper CCGL202- Metamorphic Petrology

After completing the course, students will be able to …..

CO1: Understand metamorphism.

CO2: Identify the role of temperature, pressure and fluids in metamorphism.

CO3: Identify the effect of on the characteristic metamorphic zones.

CO4: Understand depth zones, grades, and phase rules of closed and open systems.

Paper CCGL203- Geochemistry

CO1: To understand basics of geochemistry and cosmo chemistry.

CO2: To understand chemical composition and properties of earth's layers.

CO3: To understand hydrosphere and biosphere in detail.

CO4: To understand ionic substitution, types of chemical bonding, ionic radii, coordination number, lattice energy, ionization potential, electronegativity, Pauling's rule, isomorphism, polymorphism.

CO5: To understand atmosphere: its layers, chemical composition and evolution.

CO6: To understand the concepts of geochemical- biogeochemical cycling and global climate.

Paper CCGL204- Ore Geology and Analytical Techniques.

After studying the course, students will be able to understand…..

CO1: Ore genesis, spatial and temporal distribution of ore deposits from a global perspective.

CO2: Processes of formations of ore mineral deposits, ore deposits and plate tectonics, mode of occurrence of ores, their morphology and relation with the host rocks, texture, paragenesis, zoning of ores and their significance, concept of ore bearing fluids, their origin and migration.

CO3: Sampling in thin sections and polished section making with the dissolution procedures in geological and environmental samples, sample etching, staining and modal count techniques.

Paper CCGL301- Hydrogeology

CO1: To identify quality of groundwater, its origin, types, importance, occurrence, reservoirs and movement.

CO2: To identify hydrogeological properties of rocks along with the quality, estimation, parameters, hydrographs, maps and the hydro stratigraphic units.

CO3: To understand well hydraulics along with the causative factors and their measurements, methods of pumping test and analysis of test data.

CO4: To understand and apply harvesting and overexploitation.

CO3: To introduce leaners with remote sensing techniques, radioisotopes and the concepts of watershed management.

Paper CCGL302- Fuel Geology

CO1: To study fuels - composition, fractions, origin, nature and migration in detail.

CO2: To identify characteristics of reservoir rocks and traps.

CO3: To understand geology of mud engineering, drilling fluid, gas sampling.

CO4: To provide insights into productive geological horizons and nuclear power stations in India.

CO5: To provide a brief account of future perspective, mud engineering, drilling fluid, gas sampling, mud logging, sample catching and its examination and interpretation.

Paper CCGL303 - Geoexploration

CO1: To understand geophysical techniques of geo-prospecting including geochemical, geophysical and geobotanical methods.

CO2: To interpret gravity data.

CO3: To study electromagnetic, magnetic and seismic methods of geo-exploration.

CO4: To deal with remote sensing for well logging and subsurface mapping.

CO5: To understand methods of well logging and drilling.

M.Sc. II year- Semester III Paper ECGL304- Geomorphology, Remote Sensing & GIS

CO1: To understand the fundamental concepts of remote sensing, electromagnetic spectrum, bands, and resolutions.

CO2: To learn satellite remote sensing, global and Indian space missions, satellite exploration programs and their characteristics including LANDSAT, METEOSAT, SAESAT, SPOT and IRS.

CO3: To interpret satellite images and computer data in remote sensing.

CO4: To understand dynamics of geomorphology, geomorphic processes and resulting landform, geomorphic features of Maharashtra and India.

Paper CCGL401- Environmental Geology

CO1: To understand the fundamental concepts of environmental geology, environmental protection and legislative measures in India.

CO2: To understand earth systems - the energy cycles, rock cycles, impact assessment of degradation and contamination of surface water and groundwater quality due to industrialization and urbanization.

CO3: To understand the effect of organic and inorganic contamination on the quality of groundwater and its remedial measures with the water logging problems, soil profiles.

CO4: To understand impact assessment of mining, dumping of ores, mine waste and fly ash.

Paper CCGL402- Engineering Geology

After completing of the course, students will be able …..

CO1: To understand the role of engineering geology in civil construction, properties of rocks and soils.

CO2: To understand construction of various structures including dams, tunnels, bridges, roads, airfields and highways.

CO3: To equip leaners with the hazards and mitigation of the disasters including natural and man-made such as earthquake, mass movements, landslides and its types.

CO4: To understand seismicity, seismic zones of India, mitigation and disaster management.

Paper CCGL403- Mining Geology

CO1: To identify ore localization, ring targets, intersecting loci and in mining geology.

CO2: To enable leaners for mine excavation, timber treatment, methods of breaking rocks, drilling blast holes.

CO3: To identify the economic value of ores.

CO4: To understand the factors in evaluating a mineral deposit, mine examination methods such as sampling, sampling calculation, and recoverable values.

M.Sc. II year- Semester IV Paper ECGL404- Statistical Geology and Computer Applications in Geology

Learners will be able to understand……

CO1: Statistical methods of mean, mode, median, standard deviation, and kurtosis with their relationships.

CO2: Application of computer input / output devices, operating systems, memory, microprocessor, ports, utilities, and application to petrological and geochemical problems.

CO3: Various research institutes, their schemes, preparation of various scheme proposals, synopsis, abstract, review, scientific writing, research articles, dissertation and histograms.

CO4: GIS with software analysis.

COs: Jewelry Design and Gemology

Paper -141: Introduction to Gemology& Introduction to Jewelry Designing

CO1: To understand scope and importance of gemology.

CO2: To understand formation of gem minerals, earth's interior, geological activities, origin and occurrence of gem stones.

CO3: To understand basic properties of gems, minerals, chemical composition of mineral/gemstone, crystal structure, chemical bonds and basics of crystallography.

Paper -142: Mineralogy & Crystallography

CO1: To understand minerals, atomic structure, crystalline state and crystalline materials crystal lattice, amorphous and metamict minerals. Isomorphism and polymorphism. Crystallizations from melt, crystallization from solution and physical properties of minerals.

CO2: To understand crystals and poly crystalline materials - Crystal structure and symmetry, forms, habit, cleavage and internal growth of crystals.

CO3: To study crystal surface markings.

CO4: To understand crystalline features in important gemstones, conditions conductive for the formation of crystals, crystal habits and aggregates.

CO5: To understand crystal morphology-faces, forms, edges, solid angles, interracial angles and its measurement by contact goniometer, law of constancy of interfacial angles, crystal system & habit.

Paper -143: Optical Properties & Instruments

After studying the course, students will be able to understand…..

CO1: Optical properties of minerals under plane polarized light and cross Nicols isotropism and anisotropism, color, cleavage, R.I., transparency; electromagnetic spectrum - visible spectrum; nature of visible light, reflection & refraction, dispersion of light.

CO2: Polarization of light, wave length and frequency, isotropism and anisotropism, pleochroism, polarization, interference figures and their use in gem identification, diaphaneity, cut, hardness, crystal system, specific gravity, cleavage, refractive index, birefringence, inclusions, fluorescence.

CO3: Gemological microscope, refractometer, dichroscope, polariscope, its construction & use.

Paper -144 & 145: Paper-II: Jewelry Industry & Drawing Techniques

After studying the course, learners will be introduced to.....

CO1: Jewelry industry, history of ornamentation - Indus valley, different periods-mauryan, sunga, gupta, kushan, chandelle, mughal, tribal jewelry, jewelry rest of the world & European, precious & semiprecious jewelry industry, jewelry for men & women, advancement of techniques in India are studied in detail in this paper.

CO2: Basics of jewelry designing: Role of jewelry designer, understanding of various shapes found in nature, forms of creation, gemstone shapes and cuts, deriving inspiration from various elements, developing skills of turning inspiration into ideas, hand control exercise, free hand and counter sketching still life and perspective view, shading in geometrical shapes.

CO3: Theories of different types of designs.

CO4: Shapes and cuts of stones.

CO5: Rendering in gemstones faceted and cabochons.

CO6: Ideas on paper for jewelry.

CO7: Portfolio development.

GEM-304: Advanced Gemology Gemstone Formation in different rocks

Students will be able to understand…..

CO1: Igneous rocks, magmatic, hydrothermal phases and gemstone formation in pegmatite, topaz, tourmaline, beryl, and other gems. Basalts and formation of ruby.

CO2: Sedimentary rocks, placer deposits, gemstones found in gravels and other sedimentary rocks.

CO3: Metamorphic rocks and formation of gems like ruby, spinel, garnet etc.

CO4: Mining, prospecting, extraction and recovery of gemstones.

CO5: Formation of diamonds in the earth's interior.

GEM-305: Synthesis Gemstones

After studying the course, students will be able to understand…..

CO1: A brief history of early gemstone synthesis.

CO2: Flame fusion (Vernouli Process)

CO3: Czochralski (Crystal pulling).

CO4: Kyropolous

CO5: Skull melting process

CO6: Flux fusion process

CO7: Hydrothermal process

CO8: Gel growth

CO9: Ceramic process

CO10: Identification of gemstones produced by the above methods.

GEM-306: Treatments on Gemstones

After completing the course, leaners will be able to understand…..

CO1: Bleaching

CO2: Coating

CO3: Spraying and foiling

CO4: Impregnation with oil, resin

CO5: Fracture filling (colorless)

CO6: Filling of pores (porous stones) – colorless, colored impregnation (dyeing)

CO7: Heat treatment

CO8: Diffusion treatment

CO9: Beryllium diffusion

CO10: High pressure high temperature treatment

CO11: Graphitization

CO12: Glass filling lead, bismuth

CO13: Heat treatment in ruby and sapphires with different kinds of residuals, irradiation, disclosure of enhancements.

CO14: Growth lines and color zoning, twinning, types of inclusion, identification of natural and synthetic gemstones, color zone diffusion and induced feathers/fingerprints, use of laboratory equipment and methods of identification.

GEM-307: Techniques of jewelry making

After studying the course, leaners will be able to understand…..

CO1: Collection of information and mainlining documentation.

CO2: Local jeweler

CO3: Jewelry catalogues

CO4: Use of internet in jewelry making

CO5: Jewelry pictures - scrap book

CO6: Preparing document in word format.

GEM-308: Introduction to Design on computer

CO1: Understanding and application of Corel draw- need and uses.

CO2: Understanding of tools used for creating and manipulating text.

CO3: Understanding of lens, perspective and power clip.

CO4: Understanding of fitting text to a path.

CO5: Identifying color adjustment and bitmap effects.

CO6: Enhancing the skills for page setup and printing.

CO7: Use of Corel draw in jewelry industry.

GEM-309: Project III Advance Manufacturing

Leaners will be introduced to…..

CO1: Advanced techniques in manufacturing with metals.

CO2: Process of casting

CO3: Finishing and polishing techniques

Semester IV GEM- 404: Occurrence of Diamond and their types

After completion of the course, leaners will understand…..

CO1: Type of rocks and diamonds found in earth's surface.

CO2: Diamond occurrence

CO3: Types of mining

CO4: Alluvial deposits / marine deposits

CO5: Extraction of diamonds

CO6: Geological occurrence of diamonds, Diamond deposits, Kimberlite and Lamproites pipe deposits, Survey methods of diamond deposits, Mining techniques of diamond deposits, History of diamond and diamond mining, Blood diamonds and conflict diamonds, Kimberly process certification and the famous diamonds all over the world.

CO7: Diamonds and their internal structure.

GEM-405: Cutting and manufacturing of diamonds and organic gem materials

After completing the course, leaners will be able to understand…..

CO1: Techniques of cutting and polishing of diamonds - planning and making, sawing, bruiting, faceting of cable, faceting of crown, faceting of pavilion.

CO2: Manual method of planning and marking, computerized or automatic method for planning marking and diamond sawing.

CO3: History of pearls and pearl culture, taxonomy and distribution, ecology and biology

CO4: Instruments used in cutting and polishing of diamond processing.

GEM-406: Designing and Materials used in Jewelry

CO1: To understand materials used in jewelry.

CO2: To be creative for expressing using principles of designing.

GEM-407: Jewelry history and its cultural in India study of jewelry history - India

Students will be able to understand…..

CO1: Precious jewelry study- from Indian history staring for Mauryan, Gandhar to Mughal periods.

CO2: Materials available, sculpture, paintings, designs - occasion based, symbolical, trading during the era, special craftsmanship, Jewelry hubs, Costume jewelry study, from all aspects/occasion, dances, festivals, harvesting, materials available, designs - occasion based, symbolical, special craftsmanship.

CO3: Designing with orthographic perspective, rings with diamonds and color stones, pendants with diamonds and color stones, necklace using large stones.

GEM-408: Detail designing on computer

After completing of the course, students will be able to understand…..

CO1: Corel draw

CO2: Designing bigger pieces using principles of design

CO3: Stone drawing and rendering

CO4: Designing pieces with color stones/diamonds

CO5: Shadows and shadings

190 GEM-409: Project IV Jewelry making

After studying the course, leaners will be able to understand…..

CO1: Stone setting

CO2: Prone collet making and setting for different stones - emerald cut, heart, baguette taper.

CO3: Bezel collet making and setting for oval, marquise, pearl

CO4: Pave with rounds

CO5: Tension setting with rounds and princess

CO6: Channel setting for rounds

CO7: Making caps for different shapes of pearl and broilers

CO8: Creating smaller pieces using above techniques

CO9: Quality check for jewelry

CO10: Life-skills education

GEM 504: Advanced Metallurgy

CO1: Students will understand classification of metals - noble metals, base metals, alloys, solder.

CO2: Students will be familiarized to fabrication basics: Metal structure, annealing, work hardening, annealing, sawing, piercing, filing, carving, and straightening wire, drawing wire, melting. making connections cold connections, hot connections - joining, fusing soldering techniques, soldering tools and materials; forming techniques, texturing techniques mixed metal techniques;

GEM 505: Advanced Gemology

After studying the course, leaners will be able to understand …..

CO1: Gem Synthesis: Various processes of manufacturing gemstones in depth. Growth from Melt Processes involved. Identification of gemstones manufactured by various methods. Temperatures produced and required, Crucibles used, Ingredients used and the quality of gemstones crystallized, problem encountered.

CO2: Growth from solution, its similarity with gemstones produced in nature. Temperatures produced and required, crucibles used, ingredients used and the quality of gemstones crystallized fluxes used hydrothermal process, why end products are perfect crystal shaped.

CO3: Growth from vapor, sublimation, gems produced by the method.

CO4: Treatments done on Gems: In depth knowledge of Bleaching, Coating, Spraying and Foiling, Impregnation with oil, resin, Fracture filling (colorless), Filling of pores (Porous stones) – Colorless, Colored impregnation (Dyeing), Heat Treatment, Diffusion Treatment, Beryllium Diffusion, High Pressure High Temperature HPHT treatment, Graphitization, Glass filling Lead, Bismuth, Laser Drilling, Heat treatment in ruby and sapphires with different kinds

GEM 506: Indian Market - Jewelry Design

Leaners will be able to understand…..

CO1: Processing motifs, proportion, segment, proportionate segmentation; proportionate enlargement; proportionate reduction; proportionate alteration, disproportionate alterations; graduated motifs; tapered, curved; wavy, repetitive motifs.

CO2: Elements of design

CO3: Principles of design, dominance and contrast

CO4: Orthographic projections

CO5: Documentation and presentation

GEM 507: Techniques of Jewelry Making I

After studying the course, students will be familiarized with …..

CO1: Techniques of jewelry making

CO2: Documentation on manufacturing technique with relevant pictures.

CO3: Stamped jewelry

CO4: Wire jewelry including chains, filigree

CO5: Tube / hollow jewelry including electro forming

CO6: Casting jewelry, textured/ etched jewelry, engraved jewelry, enameled jewelry, Granulation jewelry

CO7: Designing collection with orthographic perspective and manufacturing for collection covered under creative expression.

GEM 508: Techniques of Jewelry Making II

To enable the learners for…..

CO1: Making of masterpiece using CAD/CAM I - JewelCad/

CO2: Making of masterpiece using CAD/CAM I - JewelCad/ Rhino

CO3: Introduction to software

CO4: Understanding of tools

CO5: Creating two dimensional jewelry

CO6: Modification of the 2D Design - as per client requirement

CO7: Creating 3 dimensional jewelry

CO8: Modification of the 3D Design - as per client requirement

CO9: Advance surfacing

CO10: Weight estimates

CO11: Codification of design

CO12: Cataloging

CO13: Presentation in 4 views

CO14: Output on CAM

GEM 604: Diamond and Diamond Grading

CO1: Introduction of diamonds

CO2: Formation of diamond in different rocks.

CO3: Diamond formation in earth's mantle

CO4: Diamond formation in seduction zones

CO5: Diamond grading

GEM 605: Polishing and Cutting of Gemstones

After studying the course, leaners will be able to understand…..

CO1: Gemstone Cutting: Styles of cutting rose cut, step cut, trap cut, briolette cut, marquise cut, brilliant cut and its different shapes, mixed cut, cushion cut, cabochon cuts, concave cut, princess cut intaglios, cameos.

CO2: Diamond cutting, the make, reducing flaws, grain, cleavage, hot process cold process equipment used types of cuts, cleaving, sawing, 2point, 3point, 4point bruiting, steps during manufacturing or cutting; rhondisting, faceting, polishing, alignment of facets, problems in faceting, eccentric table, culet, junction non alignment, hot process cold process laser cutting, Kerfing, laser sawing, proportion scope, galaxy imaging, maximum yield.

GEM 606: Export Market and Jewelry Design

CO1: International jewelry design study and design pieces based on it.

CO2: Designing jewelry based on research on mass produced jewelry for International Markets - USA, Europe, middle East, Japan, Italian, based on research on high end jewelry on International Brands - Cartier, Harry.

CO3: Winston, Chanel, Chopard using Metal, Diamond and Color stones - calculation of weight of jewelry - pricing of jewelry, mounting, Documentation and presentation.

GEM 607: Creative Jewelry Making- I

CO1: Creative Expression: Portfolio Making, Designing jewelry, based on a theme, commercially wearable Gold, Diamond and Color stones, calculation of weight of jewelry, pricing of jewelry, mounting, documentation and presentation.

CO2: History and Cultural Context: Collection based on international history, designing jewelry - based on a theme, commercially wearable gold, diamond and color stones, calculation of weight of jewelry, pricing of jewelry, mounting, documentation and presentation.

GEM 608: Hall Marking & Gem Certification-I

CO1: History and cultural context: Collection based on Indian history, designing jewelry - based on one theme, commercially wearable gold, diamond and color stones, calculation of weight of jewelry, pricing of jewelry, mounting, documentation and presentation.

CO2: Aesthetic value: Modification of the 2D Design - as per client requirement, creating 3 dimensional jewelry, Modification of the 3D design - as per client requirement, advance surfacing, weight estimates codification of design, cataloguing.

COs: Environmental Science

Concepts of Environment- I (EVS-111)

CO1: To be able to set up a goal in environmental awareness.

CO2: To understand the basic environmental components.

CO3: To solve environmental polluting problems involving topics covered.

CO4: To conserve the degraded ecosystem.

Environmental Chemistry & Natural Resources- IV (EVS-121)

CO1: To become familiar with special function of environmental chemistry and their applications.

CO2: To have a deep understanding of various types of chemical reactions.

CO3: To understand working of greenhouse effects.

CO4: To understand working of various types biodiversity and importance.

CO5: Be able to solve ozone layer problems involving topics covered.

Solid waste, Soil & Noise Pollution-VII (EVS-231)

CO1: To understand basic concepts of solid waste management.

CO2: To understand classification of SWM.

CO3: To know treatment technologies for SW.

CO4: To know techniques of safe disposal methods.

CO5: To solve hazardous waste problems.

Air Pollution – XI (EVS-241)

CO1: To familiarize learners with basic concepts and pollution related problems due to time varying fields.

CO2: To write expression for air pollution.

CO3: To understand physiological and psychological effects of all types of pollution.

CO4: To understand health impacts of different pollutions.

CO5: To understand kinds of environmental pollution with the help of air pollution study.

Water Pollution - XV (EVS-351)

After studying the course, leaners will be able to…..

CO1: Familiarize with basic concepts of water pollution.

CO2: To understand water pollution.

CO3: To understand effects of water pollution.

CO4: To understand health impacts of water pollution.

Industrial Safety & Hazardous Waste- XX (EVS-362)

CO1: To introduce learners with basic concepts of safety.

CO2: To understand the concept of safety management and hazardous waste.

CO3: To understand good and bad housekeeping.

CO4: To introduce about various applications of safety devices.

CO5: To understand safety issues.

M. Sc. Environmental Science Semester I Fundamentals of Environment (CC-ENV-401)

CO1: To be able to set up a goal in environmental awareness.

CO2: To understand the environmental components.

CO3: To enable the learners to solve environmental pollution problems.

CO4: To restore the degraded ecosystem.

Environmental Chemistry (CC-ENV-402)

CO1: To familiarize learners with special function of environmental chemistry and their applications.

CO2: To understand types of chemical reactions.

CO3: To understand working of greenhouse effects.

CO4: To understand working of biodiversity and importance.

CO5: To enable learners to solve ozone layer problems.

Environmental Instrumentation & Analysis (CC-ENV-403)

CO1: To familiarize learners with instrumentation and analysis.

CO2: To familiar learners with different types of sampling equipments.

CO3: To understand special functions and their differential mechanism in analytical instruments.

CO4: To understand in detail microbiological instruments and equipments.

CO5: To enable students to solve advantages and disadvantages of instruments.

Wildlife Conservation & Management (EC-ENV-421A)

CO1: To understand wildlife deeply.

CO2: To understand wildlife flora and fauna.

CO3: To understand the threats and causes of loss of wildlife and their applications.

CO4: To understand endangered fauna & flora of India.

CO5: To learn wildlife conservation and their management problems.

Environmental Pollution Studies (CC-ENV-404)

CO1: To familiarize learners with the basic concepts and pollution related problems to time varying fields.

CO2: To study air, water, land, and noise and radiation pollution.

CO3: To understand physiological and psychological effects of all types of pollution.

CO4: To understand health impacts of different pollutions.

Environmental Microbiology & Biotechnology (CC-ENV-405)

CO1: To familiarize learners with basic concepts of environmental microbiology and varying fields.

CO2: To understand the methods of sterilization and disease control.

CO3: To study environmental biotechnology and its applications.

CO4: To understand various kinds of environmental pollution with the help of biotechnological approaches.

CO5: To understand biosafety.

Natural Resources & Sustainable Development (CC-ENV-406)

CO1: To familiarize learners with basic concepts of natural resources.

CO2: To understand renewable and non-renewable natural resources.

CO3: To understand energy resources of nature.

CO4: To understand relativistic sustainable development and natural resources utilization.

CO5: To study conservation of resources and sustainable development.

Environmental Management System (EC-ENV-422B)

CO1: To familiarize with environment management system.

CO2: To understand environmental planning in EMS.

CO3: To understand macro and micro planning in rural and urban development.

CO4: To introduce ISO series.

CO5: To acquaint good environmental practices.

Pollution Control Technology (CC-ENV-501)

CO1: To familiarize with basic concepts and pollution related problems to time varying fields.

CO2: To understand sewage and effluent treatment in industries.

CO3: To study advanced techniques used in ETP and STP.

CO4: To understand various types of solid waste management.

Industrial Safety Management (CC-ENV-502)

CO1: To introduce with basic concepts of safety.

CO2: To understand the concept of safety management.

CO3: To understand different types of good and bad housekeeping.

CO4: To introduce applications of safety devices.

Environmental Toxicology and Biodiversity (CC-ENV-503)

CO1: To introduce environmental toxicology and biodiversity.

CO2: To understand classification of toxicants in environment.

CO3: To understand types of techniques in toxicology.

CO4: To familiarize learners with environmental biodiversity and spectroscopic analysis.

Environmental Legislation and Policies (EC-ENV-521A)

CO1: To introduce learners with basic concepts of environmental legislation and policies.

CO2: To understand different aspects of environmental laws.

CO3: To understand various aspects of environmental policies.

CO4: To understand the principles of environmental protection.

CO5: To solve environmental problems.

Remote Sensing and GIS (CC-ENV-504)

CO1: To familiarize with basic concepts of RS and GIS.

CO2: To understand Satellite RS, its working and characteristics.

CO3: To understand types of GIS, their working and properties.

CO4: To introduce with aerography and their applications.

CO5: To understand applications of aerial photographs involving topics covered.

EIA and Environmental Audit (CC-ENV-505)

CO1: To introduce with EIA and EA.

CO2: To introduce with EIA methods.

CO3: To understand assessment of EI.

CO4: To introduce typical case studies of EIA.

CO5: To understand environmental audit involving topics covered.

Hazardous waste management (CC-ENV-506)

CO1: To introduce basic concepts of hazardous waste management.

CO2: To understand classification of HWM.

CO3: To study treatment technologies for HW.

CO4: To know various techniques of safe disposal.

CO5: To understand solving of hazardous waste problems.

Disaster Management (EC-ENV-523 A)

CO1: To familiarize learners with natural hazards and disasters.

CO2: To understand the prediction of disaster.

CO3: To understand industrial disaster management.

CO4: To introduce with community based disaster management.

CO5: To enable students to solve disaster management and tool problems.

Climate change and global environmental issues (SC-ENV-522)

CO1: To introduce basic concepts of climate change.

CO2: To understand local and global environmental issues.

CO3: To know various environmental and developmental priorities in India.

CO4: To know global environmental movements and controversies.

CO5: To understand natural and man-made hazards.

COs: B. Voc. (Multimedia & Animation)

B. Voc. (Multimedia &Animation) Semester-I GCT101 - Communication and Professional Skills

CO1: To demonstrate preparation and research skills for oral presentations.

CO2: To develop proper listening skills.

CO3: To articulate and enunciate words and sentences clearly and efficiently.

CO4: To show confidence and clarity in public speaking projects.

CO5: To demonstrate ability to gather information and apply it to persuade or articulate one's own point of view.

GCT102 - Basics of Computer

CO1: To introduce to computer.

CO2: To write algorithms and to draw flowcharts which are the first step towards the computer programming.

CO3: Students will get the knowledge of history of computer and types of computer.

CO4: Students will get the idea of types of different programming languages.

CO5: Students will be introduced with types of memory and storage devices.

CO6: Students will get information of different input and output devices.

CO7: Students will get the knowledge about operating system, its types and basic features.

CT103 - Maintenance Workplace Health and Safety

CO1: Maintenance of a safe place of work for all employees.

CO2: Preparation of emergency plans and the provision of first-aid training

CO3: Training, instruction, coaching and problem - solving skills relevant to safety and health

CO4: Understanding the risks in a manager's area of responsibility

CO5: Knowledge of relevant legislation and appropriate methods of control, including risk assessment

CO6: Knowledge of the organisation‘s planning, measuring, reviewing and auditing arrangements

CO7: Awareness of the financial and economic benefits of good safety and health performance.

VCT104 - Graphic Designing

CO1: To create communication solutions that address audiences and contexts, by recognizing the human factors that determine design decisions.

CO2: To utilize relevant applications of tools and technology in the creation, reproduction, and distribution of visual messages.

CO3: To apply graphic design principles in the ideation, development, and production of visual messages.

CO4: To identify and utilize design history, theory, and criticism from a variety of perspectives, including: art history, communication/information theory, and the social/cultural use of design objects.

CO5: To participate confidently in professional design practice and management within a collaborative work environment.

CO6: To employ best practices and management in the design profession and within a collaborative work environment.

VCT105 - Script Researcher

CO1: To demonstrate familiarity with the elements of drama-such as plot, character, diction, theme, and spectacle-as well as an understanding of how these elements combine to create a theatrical experience.

CO2: To develop a working definition of drama that notes its divergence from other narrative forms.

CO3: To develop an original subject and the ability to illuminate it from multiple points of view.

CO4: To demonstrate an understanding of the unification of form, content, and structure in a script.

CO5: To use fictional elements in their writing.

CO6: to develop critical skill for evaluating own writing, that of their peers, and that of professionals.

VCT106 - 2D Animation

CO1: To create drawings and paintings using custom brush libraries.

CO2: To demonstrate the use of digital drawing tools for both bitmap and vector software.

CO3: To export digital content for use in other software programs.

CO4: To synthesize painting and drawing techniques to create stylized artwork.

CO5: To use Bezier paths to digitally ink vector graphic drawings.

CO6: To create storyboards that shows continuity between shots.

CO7: To render effective storyboard panels including notation.

CO8: To sketch key emotions and body language.

Semester-II GCT201 -Web Technology

After studying the course, leaners will be able to…..

CO1: Understand HTML, XHTML, HTML5 and its elements.

CO2: Create static web pages.

CO3: Code program in web page.

CO4: Create dynamic web pages.

CO5: Study CSS3 to design web page.

CO6: Design web pages using cascaded style sheets.

GCT202 - Data Base Management System (DBMS)

CO1: To know about database system basic concepts, architecture, features, purpose, advantage of DBMS.

CO2: To understand component of a DBMS: Users, facilities & structure.

CO3: To learn the data modeling & design.

CO4: To understand entity-relationship and data model.

CO5: To understand the basics of relational model, normalization, relational algebra.

CO6: To introduce learners to oracle s/w.

CO7: To understand physical storage of data.

CO8: To understand architecture of database system.

VCT204 - Camera Operator

CO1: To demonstrate appropriate shutter settings for motion and freeze action.

CO2: To determine correct exposure values to produce photographic images.

CO3: To identify and describe the parts of a camera (i.e. lens, f/stop, shutter, etc.) and their functions.

CO4: To identify compositional elements (i.e. line, texture, shape, patterns, perspective) of a photographic image.

CO5: To relate aperture settings in depth of field characteristics.

CO6: To select and present photographs in a presentation format appropriate to the subject (e.g. dry mounting, digital media, projection.)

VCT205 - 3D Animation

CO1: To work with and navigate the unique features of the digital 3D modeling workspace to create 3D objects.

CO2: to identify characteristics of rendering 3D objects for optimal system processing and analysis.

CO3: To create a 3D environment featuring lighting and textures.

CO4: To create basic 3D models and animations.

CO5: To evaluate digital 3D projects, identify items for improvement, and implement changes.

VCT206 - Stop Motion Animation

CO1: To calculate and apply appropriate frame rates.

CO2: To manipulate animation production equipment

CO3: To create accurate and aesthetically appealing stop motion animation

CO4: To describe characteristics of well-designed and executed animation

CO5: To correlate some knowledge of the history of animation

CO6: To assess and critique past and current animation trends

CO7: To demonstrate progress in basic sculpting, puppet making and animation skills

CO8: To analyze critically creative work.

Semester-III GCT301-Roto Artist

CO1: Tracing live action images for animation

CO2: Creating depth maps for stereo conversion

CO3: Removing faults/wires in live action footage

CO4: Creating matters for visual effects

CO5: Color grading for specific objects/frames

CO6: Use the software to break the content down into individual frames in accordance to requirements

CO7: Ensuring the work-products meet horoscopy objectives and quality standards and are ready for compositing

CO8: Respond positively to feedback and changes in creative requirements

GCT302- Clean up artist

CO1: Cleaning-up and finalizing artwork for production, under supervision

CO2: Character packs, background visuals, architecture, machinery, props, and landscapes.

CO3: Life drawing including human anatomy, emotions, actions and expressions.

CO4: Human mannerisms, behavior, facial expressions, walking style

CO5: Different types of landscapes, geographies and architecture

CO6: To draw, paint and clean frame-by-frame layouts

CO7: To represent perspective and three-dimensional spaces

CO8: To work on image editing software such as flash, adobe Photoshop, and gimp etc.

GCT303- Adobe Illustrator

CO1: To identify the purpose, audience, and audience needs for preparing images.

CO2: To communicate with colleagues and clients about design plans.

CO3: To determine the type of copyright, permissions, and licensing required using specific content.

CO4: To demonstrate knowledge of key terminology related to digital images.

CO5: To demonstrate knowledge of basic design principles and best practices employed in the design industry.

VCT304 -3D Modeling

Learners will be able to …..

CO1: Demonstrate ability to create organic looking 3D objects.

CO2: Demonstrate ability to design UV layout, and texture 3D objects.

CO3: Demonstrate ability to design an appropriate setup, and light a 3D scene.

CO4: Demonstrate ability to render a 3D scene following professional methods for maximum realism of the scene.

CO5: Light a 3D object using three-point lighting.

VCT305 -Script Writer

After completing the course, learners will be able to …..

CO1: Identify the formal elements of story.

CO2: Demonstrate an understanding of the limitations and opportunities particular to theatre and film.

CO3: Develop an original subject and the ability to illuminate it from multiple points of view.

CO4: Demonstrate an understanding of the unification of form, content, and structure in a script.

CO5: Analyze a story's potential for animation.

VCT306- Animation Director

CO1: To create drawings that conveys action in terms of movement, emotion, attitude, and expression.

CO2: To present story points or ideas completely and clearly through staging.

CO3: To identify the elements of a story.

CO4: To create storyboards that shows continuity between shots.

CO5: To render fluid "arc" movements for a falling leaf.

Semester-IV GCT401-Action Script

CO1: To define successful game level design.

CO2: To design platform specific levels for original game concepts.

CO3: To identify characteristics of successful user interfaces.

CO4: To present synopses of games utilizing simplicity, consistency, suspense, and fairness.

CO5: To develop marketing strategies for game distribution.

CO6: To differentiate between the main production cycles of design, art building, technical scripting and marketing.

CO7: To produce game prototypes.

GCT402-Video Editing

CO1: To combine basic design principles in video editing.

CO2: To generate a video by applying his/her knowledge.

CO3: To present the edited video.

CO4: To apply required corrections in his/her project and presents it in the class.

CO5: To learn adobe premiere pro software in basic level.

CO6: To record short clips by using camera.

CO7: To import clips to the hard disk.

CO8: To edit clips by using adobe premiere pro software.

GCT403- Film Making

CO1: To analyze the historical and theoretical foundations of filmmaking.

CO2: To create film work that manifests the filmmaker's unique voice.

CO3: To analyze story structure and the screenwriting process for use in the critique and creation of film.

CO4: To apply current best practices in cinematography.

CO5: To apply current best practices in editing language and visual effects.

CO6: To manage the resources and logistics required to produce a film.

CO7: To collaborate as a member or leader of a filmmaking team.

VCT404 -Design of Character

CO1: To demonstrate the ability to render believable characters through a variety of mark making media, styles and techniques.

CO2: To explore a variety of compositional formats of their character including perspective, foreground, midground, background

CO3: To create believable characters in a narrative setting

CO4: To evaluate own work and the work of others through peer assessment and critique

CO5: To establish drawing practice, process and development.

VCT405-Sound Designer

CO1: To identify sound file formats

CO2: To incorporate sound file import and export procedures into an editing system.

CO3: To prepare sound files for editing

CO4: To identify basic sound editing tools and techniques

CO5: To implement basic editing functions for sound

CO6: To determine the components for a sound mix

CO7: To implement a sound mix for a final audio/visual project

CO8: to export deliverable sound formats to meet industry standards

VCT406 Art Director

CO1: To use a variety of brainstorming techniques to generate novel ideas of value to solve problems.

CO2: To use develop ideas that are relevant and responsive to the world around them.

CO3: To collaborate as a team with copywriters, photographers, illustrators, multimedia artists, and graphic and web designers.

CO4: to conceptualize visual solutions to communicate brand and identity.

CO5: To present a portfolio/website of art direction that shows a variety of campaigns that includes typography/graphics, storyboards, illustrations or photography.

CO6: To create copy written such as advertising headlines, body copy or scripts for storyboards.

Semester-V GCT501- Adobe InDesign

CO1: To work comfortably with the InDesign screen and workspace

CO2: To work with a broad range of InDesign tools

CO3: To work with text in a document

CO4: To format text using a variety of techniques

CO5: To work with graphical elements in a document

CO6: To bring excitement to your documents with color

CO7: To create and work with alternate layouts for the same document

CO8: To prepare your document for a variety of printing options

GCT502- Texturing Artist

After studying the course, learners will be able to understand….

CO1: Modeled Hi-poly and Low-Poly characters, and props in 3D applications

CO2: Planned and created models and their UV unwraps as well as set up their various maps and textures.

CO3: Textured game environment assets for the curious George console/PC game.

CO4: Research and locate suitable high-res textures; add textures to 3D models for the production of video games.

CO5: Developing concert, designed track layout, functionality, game assets, and textures.

GCT503- Lighting Artist

CO1: To generate possibilities for lighting each scene consistent with the mood and creative style of the production and in accordance to the design brief.

CO2: To determine the placement of lights and shadows in each frame

CO3: To light all the frames digitally

CO4: To understand creative concepts of production

CO5: To respond positively to feedback and changes in creative requirements

CO6: To understand the theory and principles of lighting, shadows, exposure, natural light, color space, reflections etc.

VCT504 -Concepts of Director – I

CO1: To understand the filmmaking fundamentals

CO2: To understand real human behavior

CO3: To understand film conventions

CO4: To grow as a person and be better at doing.

VCT505 -Director of Photography – I

CO1: To acquire artistic abilities.

CO2: To photograph creatively subjects and utilize light, colors, and shadows to better complement their shots.

CO3: To acquire strong customer service skills in order to interact with clients and understand their needs.

CO4: To have effective project management skills in order to successfully manage simultaneous projects.

CO5: To edit photographs.

VCT506- Live Action Director – I

CO1: To update industry trends and developments.

CO2: To understand the research profile and preferences of the target audience, the genre, culture and region of the production

CO3: To understand network with script-writers, industry experts, creative personnel and producers to source ideas.

CO4: To work across departments within film production.

CO5: To pitch potential ideas of decision makers and solicit feedback.

Semester-VI GCT601- Concepts of Editor

CO1: To develop creativity for editing, arranging and footage during the editing process.

CO2: To prepare document notes and specifications for guidance and reference during post production processes.

CO3: To read and understand the script and determine requirements.

CO4: To gather and watch raw footage/material including raw camera footage, dialogue, sound effects, graphics and special effects

CO5: To understand the creative vision and editing requirements.

GCT602 - Layout Designer

CO1: To record continuity-related details.

CO2: To design layouts and templates.

CO3: To create layouts for production.

CO4: To conceptualize backgrounds, architecture, machinery and props designs and draw out on different possibilities out on paper, including turnarounds.

CO5: To visualize the shot composition and assemble the assets – characters and backgrounds – for each scene as per the storyboard.

GCT603 - Script Editor

CO1: To specify a concept using taglines, loglines, synopsis, exposes, storyboards.

CO2: To understand concepts complying with norms and guidelines specific to the industry/genre/region/language/culture.

CO3: To use correct grammar, spelling, punctuation and phonetics for the language.

CO4: To read and understand concepts, notes or other materials.

CO5: To understand the key elements of the concept.

VCT604 - Concepts of Director – II

CO1: To understand the filmmaking fundamentals

CO2: To understand real human behavior

CO3: To understand film conventions

CO4: To understands learning mechanism.

VCT605 -Director of Photography – II

CO1: To understand camera techniques and shooting media.

CO2: To assess the visual style of production from the script and through discussions with the producer and director

CO3: To identify inconsistencies among the story, dialogue, resulting action and apparent continuity issues

CO4: To break-down the script into sequences, shots and list out detailed characteristics of each shot.

CO5: To estimate the cost and time for shoots.

VCT606 - Live Action Director – II

CO1: To understand functional roles, responsibilities, expectations, requirements, budget and timelines for circulation to functional heads.

CO2: To document issues, feedback and suggestions after discussions with production team.

CO3: To communicate the creative vision and production aspects to the entire production team.

CO4: To discuss and agree on the roles, responsibilities, expectations, requirements, budget and timelines.

CO5: To understand network with script-writers, industry experts, creative personnel and producers to source ideas.

Course outcomes BCA

Accountancy I

CO1: To understand double entry accounting system and application of its rules.

CO2: To understand business transactions in preparing 'financial statements' of sole traders and partnership firms.

CO3: To know the mechanism of maintaining 'Single and Double Column Cash Book'.

CO4: To find early step employability in MSMEs in accounts.

CO5: To develop confidence for the preparation of professional courses like CA, CMA and CS.

Industrial Economics

CO1: To understand the importance of micro and macro economics

CO2: To analyze the impact of e-commerce on business models and strategy.

CO3: To describe the major types of economics.

CO4: To understand the obstacles in the development of an under developed economy.

CO5: To identify the factors of production and its rewards

CO6: To understand the indifference curve analysis.

Business Statistics

CO1: To produce appropriate graphical and numerical descriptive statistics for different types of data.

CO2: To apply probability rules and concepts related with discrete and continuous random variables to answer questions within a business context.

Operating System I

Learners will be able to understand….

CO1: Fundamental concepts of operating system

CO2: Types and functions of operating systems

CO3: DOS structure and commands

CO4: Applications of batch file programming

CO5: To create and execute basic batch file scripts

CO6: to understand differences between Windows and DOS

Communication Skills

CO1: To understand and apply knowledge of human communication and language processes.

CO2: To understand and acquire communication skills.

Basics of Web Technology I

CO1: To understand the basics of web technology.

CO2: To make aware the learners about coding in editors.

CO3: To understand web designing

CO4: To understand the basics of web designing.

CO5: To create and execute web pages.

CO6: To understand Html tags, CSS and JSS.

Semester II Financial Accountancy II

CO1: To describe, explain, and integrate fundamental concepts underlying accounting, finance, management, marketing, and economics.

CO2: To apply information to support business processes, practices, such as problem analysis and decision making.

Operating System II

CO1: To understand fundamental operating system abstractions.

CO2: To understand processes, threads, files, semaphores, IPC abstractions, shared memory regions etc.

Business Mathematics

CO1: To demonstrate basic marketing mathematics.

CO2: To apply logic to solve problems including trade discounts, cash discounting, and markup and markdown calculations

Programming in C

CO1: To understand the fundamental concepts of programming

CO2: To become aware of steps of problem solving, designing an algorithm and flowchart

CO3: To understand the structure of procedure oriented programming

CO4: To acquire ability to convert problems into programs

Principles of management

CO1: To understand the primary functions of management and the roles of managers.

CO2. To aware students about the major contributions done in the field of management.

Basics of Web Technology II

CO1: To analyze a web page and identify its elements and attributes.

CO2: To create web pages using XHTML and Cascading Style Sheets.

CO3: To build dynamic web pages using JavaScript.

CO4: To create XML documents.

Principles of management

CO: To gain knowledge about all management process and create understanding in detail about the application of management in various specialized activities such as finance management, material management, HRM, etc.

Semester III

OOPs using CPP

CO1: To describe the object-oriented programming approach in connection with C^{++}

CO2: To apply the concepts of object-oriented programming.

Business law I

CO1: To understand the changing time business needs.

CO2: To create awareness about rights and the safety.

CO3: To understand amendments in business.

CO4: To understand threats and legal consequences

CO4: To acquire skills to survive in business world

CO5: To study rights of consumers and help students to develop their overall skills.

DBMS

CO1: To understand the basics of DBMS.

CO2: To make the learners about DBMS and relational database.

CO3: To understand relation between database systems.

CO4: To understand the techniques of concurrency.

CO5: To understand normalization and its rule.

CO6: To learn how to fetch fire the query in DBMS

E- Business Essential

CO1: To understand the concepts and nature of e- business.

CO2: To make aware of ethics of e-business.

CO3: To understand the relation between e-business and ICTs.

CO4: To understand e-business model and supply chain management.

CO5: To gain knowledge of internet banking.

Semester IV

Data Structure & algorithm

CO1: To understand the fundamental concepts of Data Structure

CO2: To make learners aware of sorting techniques

CO3: To understand algorithms and their development

CO4: To applying the understanding in solving basic programming problems

CO5: To create and execute ideas using problem solving approach

Cost Accountancy

CO1: To enable learners to acquire management skills.

CO2: To account for costs by factoring in both variable and fixed costs.

Java Programming

CO1: To understand the differences between Java and CPP

CO2: To differentiate between structured and object-oriented programming approaches.

CO3: To understand the significance of Java and jdk environment

CO4: To become aware of code in java and develop applications

CO5: To understand debug and remove errors

CO6: To create Applets in Java

MIS & DSS

CO1: To analyze the impact of MIS on the working of an organization.

CO2: To describe the major types decisions.

CO3: To explain the process of Supply Chain Management.

CO4: To identify the Limitations of Information Technology.

Business law – II

CO1: To understand basic and broad knowledge in business laws in management.

CO2: To learn the concepts, principles and theories.

CO3: To understand simple business laws.

CO4: To create awareness of the different business laws.

Entrepreneurship development

CO1: To understand the nature of entrepreneurship.

CO2: To understand the function of the entrepreneur in the successful, commercial application of innovations.

CO3: To confirm an entrepreneurial business idea.

Advance Networking

CO1: To plan the interworking of distributed application basing on Semantic Web technology.

CO2: To develop and evaluate distributed application architectures according to functional requirements.

Semester V : Management Accounting

CO1: To explain the relationship between cost accounting-financial accounting and managerial accounting.

CO2: To explain the concept of management accounting

CO3: To explain the importance of management accounting for businesses

SQL 2017

CO1: To build and maintain database using SQL commands.

CO2: To use DML statements like insert, update and delete.

CO3: To write and call stored procedures in database.

CO4: To use functions stored in database.

VB:

CO1: To understand the visual programming concepts.

CO2: To explain basic concepts and definitions.

CO3: To express constants and arithmetic operations.

CO4: To distinguish between variable and data types

Organizational Behavior

CO1: To demonstrate the applicability of the concept of organizational behavior.

CO2: To demonstrate the applicability of analyzing the complexities associated with management of individual behavior in the organization.

CO3: To analyze the complexities associated with management of the group behavior in the organization.

Software engineering

CO1: To understand the SDLC and various software development models

CO2: To become aware of the needs and requirements of software development

CO3: To understand the development of applications.

Banking & Insurance

CO1: To introduce the banking system in India.

CO2: To explain the various functions of Reserve Bank of India.

CO3: To enhance the understanding of factors of Electronic Banking educate about the forecasting and decision making procedure in management.

CO4: To know the meaning of Insurance and study Insurance companies with its role and functions

Semester VI

Elements of Commercial Portal (HTML 5)

CO1: To acquire the skills for website development skills.

CO2: To become aware of current trends and technologies

CO3: To understand the mobile OS development and get industry competent skills.

Business Law III

CO1: To explain the concepts in business laws with respect to foreign trade.

CO2: To apply the global business laws to current business environment.

CO3: To analyze the principle of international business and strategies adopted by firms to expand globally.

Software testing

CO1: To understand different software testing techniques and strategies and be able to apply specific (automated) unit testing method to the projects.

CO2: To distinguish characteristics of structural testing methods.

CO3: to discuss the relevance of the services

COs of BBA

Course outcomes BBA

Semester I

Business Accountancy I

CO1: To use information to support business processes and practices, such as problem analysis and decision making.

CO2: To apply quantitative skills to help, analyze and solve business problems.

CO3: To understand business opportunities.

Management Perspective I

CO1: To develop knowledge about management perspectives in students.

CO2: To learn the basic functions of management.

CO3: To understand various types of theories and principles.

CO4: To understand different thinkers.

Business Statistics

CO1: To describe and discuss the key terminology, concepts tools and techniques used in business statistical analysis.

CO2: To evaluate critically the underlying assumptions of analysis tools.

I.T Fundamentals

CO1: To understand the concept of input and output devices of computers.

CO2: To recognize the basic terminology used in computer.

CO3: To understand the Operating System Concepts

CO4: To work on command base as well as GUI interface

Human Communication in Business

CO1: To demonstrate a good understanding of effective business writing.

CO2: To Effective business communications.

CO3: To understand research approaches and information collection.

Business Organization

CO1: To explain the importance of business, commerce, industry, profession, vocation.

CO2: To analyze the impact of ownership organization decision choice form of organization.

CO3: To identify strengths and develop areas for growth

CO4: To identify the forces that drive supply and demand within an economic system

CO5: To explain the concept of corporate social responsibility (CSR)

Business Accountancy II

CO1: To describe, explain, and integrate fundamental concepts underlying accounting, finance, management, marketing, and economics

CO2: To use information to support business processes and practices, such as problem analysis and decision making.

CO3: To apply quantitative skills to help analyze and solve business problems and to take advantage of business opportunities.

Semester II

Management Perspective II

CO1: To apply the concept of opportunity cost and employ marginal analysis for decision making.

CO2: To analyze operations of markets under varying competitive conditions

CO3: To analyze causes and consequences of unemployment, inflation and economic growth.

Environmental Awareness-I

CO1: To create environmental awareness

CO2: To enhance critical thinking skills

CO3: To develop personal growth and life-building skills including confidence, autonomy, and leadership.

Administrative Practices

CO1: To understand the concepts related to business.

CO2: To demonstrate the roles, skills and functions of management.

CO3: To analyze effective application of AP knowledge to diagnose and solve organizational problems and develop optimal managerial decisions.

I.T. Applications in Business –I

CO1: To gain familiarity with the concepts and terminology used in the development, implementation and operation of business application systems.

CO2: To apply information technology to support existing businesses and strategies.

Semester III

Cost Accountancy –I

CO1: To understand the various concepts, terminologies, tools & amp; techniques used in cost accounting

CO2: To understand the significance of cost accounting into business organizations.

CO3: To understand the production methods and importance of production planning.

CO4: To identify the production problems.

CO5: To understand concepts of materials management.

Management Perspective III

CO: To understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.

Environmental Awareness-II

CO1: To explain the importance of environment

CO2: To analyze the impact of natural disasters on the environment

CO3: To describe the types of waste and its management.

CO4: To explain the process of rain water harvesting and water shed management concept.

Business law –I

CO1: To understand regulations and contracts.

CO2: To bring awareness among students about their rights and the safety provided by such acts.

CO3: To safeguard against threats and legal consequences

CO4. To understand latest acts amended to survive in business world and accordingly cultivated for consumers

CO5: To study rights of consumers and help students to develop their overall skills.

Entrepreneurship Development

CO1: To introduce the originating theories of entrepreneurship.

CO2: To explain opportunities in business.

CO3: To enhance the understanding of factors of market research and innovation in entrepreneurship.

CO4: To know the tools and techniques to upgrade entrepreneurship.

Human Factors in Business

CO1: To explain the importance of human factor in business.

CO2: To analyze the impact of motivation on employees.

CO3: To describe perception, learning, impression management to students.

CO4: To inculcate values and good attitude towards job.

Semester IV Cost Accountancy –II

CO1: To understand the concepts of costing and accounting procedures.

CO2: To study practical adjustments in production with elements of cost

Management Perspective IV

CO1: To understand the concepts related to business.

CO2: To demonstrate the roles, skills and functions of management.

CO3: To understand the complexities associated with management of human resources in the organizations and integrate the learning in handling these complexities.

Operational Research

CO1: To understand the fundamental concepts and history of operations research.

CO2: Students become aware of mathematical models for solving analyzing managerial problems.

CO3: To understand simplex method and model problems in LPP manner

CO4: To understand transportation models

Business law –II

CO1: To explain the concepts in business laws with respect to foreign trade.

CO2: To apply the global business laws to current business environment.

CO3: to analyze the principle of international business and strategies adopted by firms to expand globally

I.T. Applications in Business –II

CO1: Gain familiarity with the concepts and terminology used in the development, implementation and operation of business application systems.

CO2: Explore various methods that Information Technology can be used to support existing businesses and strategies

OE& C

CO1: Gaining knowledge about organizational development process.

CO2: To develop organizations.

CO3: Better understanding of the change management model.

CO4: To develop skills for the development process.

Semester V Management Accounting

CO1: To understand the meaning, importance, objectives, scope, functions, terminologies, used in management accounting.

CO2: To understand the significance of financial statement analysis and tools and techniques of its.

CO3: To understand the meaning, advantages, limitations, classifications of ratios and importance of its in the analysis of Financial Statements.

CO4: To understand the concept of fund flow statement and cash flow statement.

Management Perspective V

CO1: To understand the concepts related to business.

CO2: To demonstrate the roles, skills and functions of management.

CO3: To understand the complexities associated with management of human.

Capital Markets I

CO1: To explain the basic concepts about capital market.

CO2: To define money markets and instruments.

CO3: To define the legal arrangements about money markets.

CO4: To classify the functions of capital market.

Taxation Laws I

CO1: To utilize the definitions of the various components of income tax law.

CO2: To apply basic tax concepts to simple fact situations and communicate potential income tax ramifications in writing and orally.

Institutional Assistance to Business

CO1: To focus on the economic and industrial development of backward, hilly and tribal areas of India.

CO2: To understand growth of small-scale industries and business units and to suggest.

Cyber law –I

CO1: To introduce the cyber world and cyber law in general

CO2: To explain about the various facets of cyber crimes

CO3: To enhance the understanding of problems arising out of Cyber Jurisdiction aspects

CO4: To educate about the regulation of cyber space at national and international level.

Semester VI

Auditing

CO: Basic understanding of generally accepted auditing standards, audit reporting, and the theory and methodology of auditing.

Management Perspective VI

CO1: To understand organizational structure and culture contribute to management control in organizations.

CO2: To analyze an organizational structure.

CO3: To understand an organization's characteristics.

Capital Markets II

CO1: To explain the importance of capital market.

CO2: To understand financial markets.

CO3: To understand trading in the stock market.

Taxation Laws II

CO1: To enable the students to identify the basic concepts, definitions and terms related to income tax.

CO2: Students will identify the technical terms related to income tax.

CO3: To enable the students to determine the residential status of an individual and scope of total income.

Cyber Law –II

CO1: To acquire knowledge about securing both clean and corrupted systems, protect personal data, and secure computer networks.

CO2: To understand key terms and concepts in cyber law, intellectual property and cybercrimes, trademarks and domain theft.

CO3: To examine secure software development practices.

CO4: To understand principles of web security.

COs: Commerce

B. Com. B. Com First Year, First Semester (CBCS Pattern) Financial Accounting-I (Paper–III)

CO1: It clears the basic concepts of accounting and enables students to prepare journal, ledger and balance sheet of the sole trader.

CO2: To enable the students to calculate depreciation, accounts of non-trading concern and royalty account.

CO3: It makes aware about hire purchase and installment purchase system.

CO4: It clears the concepts of royalty and makes aware students to calculate royalty.

Business Mathematics and Statistics-I (Paper–IV)

CO1: It clears the basic concepts of statistics, data collection, sampling and tabulation of data.

CO2: It provides basic knowledge of positional averages and enabled to calculate it.

CO3: To understand measures of dispersion- mean deviation & standard deviation.

CO4: To provide knowledge to student of determinants and matrices.

Business and Industrial Economics-I (Paper–V)

CO1: This course exposes the students to the significance and scope of business economics.

CO2: To provide the knowledge about indifference curve, consumer's equilibrium, elasticity of demand.

CO3: It provides knowledge regarding the elasticity of demand and demand forecasting.

CO4: To understand the knowledge of various market structures and factors pricing.

Computer Application in Business–I (Paper–VI)

CO1: It provides basic knowledge of computer, computer codes and languages; Computer Codes; Different number systems, Binary, Octal, Hexadecimal, and Decimal.

CO2: To equip the students with the ability to analyze, Interpret and use Computer Application in business enterprise.

CO3: Different Input / Output and storage devices, modern computing devices and Technologies.

CO4: It enables students to work in MS Word with different office documents.

CO5: To provide the knowledge of MSEXCEL, formatting and layout of worksheet, Excel Templates.

Entrepreneurship Development-I (Paper–VII)

CO1: It provides the basic knowledge of entrepreneurship with functions of successful entrepreneur.

CO2: To equip the students with the ability to analyze and interpret Entrepreneurship in Economic Development.

CO3: It clear the concepts of different mechanisms help to start-up.

CO4: This Course provides students how to Set-up a new Venture.

CO5: This course provides Knowledge about essentials of entrepreneurship in 21st century.

CO6: It inform to students regarding different start-up schemes of government and non-government agencies.

CO7: It enhances the ability of students regarding project identification and provides information about different information centre in India.

Office Management –I (Paper–VII)

CO1: It enables students to understand the basic concepts of office and administration make aware about functions of office manager.

CO2: It provides knowledge about filing, indexing and mailing procedure of different office and administrative functions.

CO3: It informs to students regarding the different forms, stationary and purchase procedure.

CO4: To provide information of different office equipments, office automation, budgeting and audit system.

CO5: To make aware to the students regarding different banking facilities.

B.Com First Year, Semester II (CBCS Pattern) Financial Accosting II (Paper–III)

CO1: To provide knowledge of basic accounting concepts, accounting standards and accounting principles the aim is also to provide the practical accounting knowledge.

CO2: To enable the students about depreciation and royalty account.

CO3: To make an ability to understand accounts of non-trading concern and branch accounts.

CO4: To enrich students in financial accounting

CO5: To enhance the ability to solve practical sums of departmental accounts and consignment accounting.

Business Mathematics and Statistics II (Paper–IV)

CO1: To make students learn and understand the concept of Co-relation.

CO2: Student is expected to have knowledge of the types and methods of estimating regression lines.

CO3: This course provides Knowledge about Index Numbers, its types and `uses.

CO4: To understand the procedure of application of Probability.

CO5: This Course provides knowledge & ability among students for using statistical tools with Computer.

Business Organization and Management (Paper –V)

CO1: To make students learn and understand the foundation of Indian Business & emerging opportunities in Business.

CO2: Student is expected to have knowledge of the forms of organization.

CO3: This course provides Knowledge about process of Management & Organization.

CO4: To understand the procedure of Leadership, Motivation & Control.

CO5: This Course provides knowledge of functional areas of management.

Business Communication (Paper–VI)

CO1: To make students learn and understand Business communication.

CO2: Student is expected to have knowledge about the Business correspondence i.e. letter writing, preparing the resume and job application letter.

CO3: This course provides Knowledge about report writing.

CO4: To understand the procedure of oral presentation.

CO5: This Course provides knowledge & ability among students for modern forms of communicating.

Optional Group Entrepreneurship Development (Paper-VII)

CO1: To make students learn and understand the role of Entrepreneurship in Economic Development.

CO2: Student is expected to have knowledge of the emerging trends in Entrepreneurship Development

CO3: This course provides Knowledge about Project identification and Resource Management.

CO4: To understand the procedure of Entrepreneurship Development Program.

CO5: This Course provides knowledge for students how to Selection, Preparation & what are the requirement for the project.

Office Management (Paper–VII)

CO1: To make students learn and understand the Modern office & its Functions

CO2: Student is expected to have knowledge about office system and role of manager in system

CO3: This course provides Knowledge about office services.

CO4: To understand the procedure of record management and reporting.

CO5: This Course provides knowledge for EDP Environment for effective office management.

B.Com. S. Y. III Semester III (CBCS Pattern) Corporate Account-I (Paper - III)

CO1: To create awareness about Corporate Accounting in conformity with the provisions of Companies Act and as per Indian Accounting Standards.

CO2: To make aware about the conceptual aspect of corporate accounting.

CO3: To acquaint about issue and forfeiture of shares with re-issue procedure.

CO4: To make practice the final account of Joint Stock Company.

CO5: To enable students to acquire the knowledge of redemption of debentures and preference shares.

CO6: To understand the knowledge of profit prior to incorporation.

Cost Account-I (Paper -IV)

CO1: To create ability of students to understand basic cost accounting concepts and the classification of cost.

CO2: To provide the knowledge of material handling methods such as LIFO, FIFO, simple average and weighted average.

CO3: To explain the labor costing methods like incentive scheme, wage payment, time and piece rate etc.

CO4: Awareness will be received about costing methods and techniques.

CO5: To develop overheads knowledge and its methods of distribution.

I.T. Application in Business I (Paper -V)

CO1: To aware about C-Language and relevant software.

CO2: To acquaint the student about importance of operators in C and use of computer for it.

CO3: To enhance the knowledge of control benchmarking and decision making in C.

CO4: To guide students about loop and its type.

CO5: To make practice arrays and strings.

CO6: To encourage students to learn practical application of C- Language.

GST Account-I (Paper -VI)

CO1: Creating ability of students to learn tax concepts, procedure and legislation pertaining to GST in India.

CO2: To make perfection in learning of GST Registration process.

CO3: To understand practical online GST registration process and filling GST returns.

CO4: To provide knowledge of supply under GST and valuation of supply.

CO5: Ability of student is to be existed to learn input tax credit.

CO6: Understand GST accounting with their documentation and keeping process of records in GST.

Financial Management-(Paper -VII)

CO1: To enhance financial literacy of students.

CO2: To make aware students about financial planning and financial sources.

CO3: To analyses budgeting and learned different methods or techniques of capital structure.

CO4: To acquaint about working capital management of a firm and its importance.

CO5: To learn how to analyze leverages.

CO6: To enlighten students regarding the dividend policy and decision making in finance.

Indian Economy (Paper -VII)

CO1: To orient the students about the recent trends in Indian Economy.

CO2: To create awareness about economic reforms in India since 1991.

CO3: To inculcate knowledge of various aspects of Indian Economy through practical approach like calculation of GDP, national income etc.

CO4: To provide detail information of causes, effects and government measures to reduce unemployment in India.

CO5: To acquaint the knowledge of five years plans and budget.

B.Com. T.Y. Old Pattern (Semester V and VI) Advanced Financial Accounting-I (Paper No. XXIX) and Advanced Financial Accounting-II (Paper No. XXXV)

CO1: To equip the students with the ability to analyze, Interpret and use financial account in business enterprise.

CO2: To introduce stock market, Electricity Company, insolvency accounts of local government and farm accounting.

CO3: To provide the knowledge of social accounting, departmental accounting, investment accounting, bank final account and accounts of insurance companies.

Management Accounting-I (XXX) and Management Accounting-II (XXXVI)

CO1: To equip the students with the ability to analyze interpret accounting information in managerial decision making.

CO2: To have a good working knowledge of the subject.

CO3: To understand the application of management accounting techniques.

CO4: To provide the knowledge of budgeting and responsibility accounting.

Cost Accounting-I (XXXI) and Cost Accounting-II (XXXVII)

CO1: To expose the students to the basic concepts and the tools used in cost accounting.

CO2: To provide the knowledge about Single and output costing.

CO3: To explain the different accounting methods such as contract costing, operating costing and process costing.

Indirect Taxes and Direct Taxes-I (XXXII) and Indirect Taxes and Direct Taxes-II (XXXVIII)

CO1: To expose students to the basic tax concepts, procedure and legislation pertaining to indirect tax.

CO2: To provide the basic of Income tax act 1961.

CO3: To understand practical knowledge of income for salary and business and profession.

CO4: To provide knowledge to student of all direct sources of income tax.

New Auditing Trends-I (XXXIII) and New Auditing Trends-II (XXXIX)

CO1: To understand about the auditing procedure.

CO2: To enable the students to understand the auditing concepts and new auditing trends.

CO3: To explore the knowledge Cost and Management Audit, Human Resource Audit, Investigation, Trends in Cooperative Audit and Tax Audit are explained throughout the subject work.

Optional Group Banking and Insurance-I (XXXIV) and Banking and Insurance-II (XXXX)

CO1: To familiarize student with banking and practices of banking.

CO2: To equip the students with the knowledge of modern banking.

CO3: To develop employability of student in banking, financial and other economic sector.

CO4: This course enables the students to know Fundamental of Insurance.

Information and Communication Technology-I (XXXIV) and Information and Communication Technology-II (XXXX)

CO1: To familiarize the students with the programming in C environment.

CO2: To familiarize the student with all the latest new age system prevalent in business Domain.

CO3: To Provide the knowledge of E-banking, Security in e-banking, ERP, BPO and Knowledge Management.

M. Com. M. Com. (First Sem) Management Process and Organizational Behavior Statistics:

CO1: To understand the basic organizational process of management.

CO2: To study organizational behavior.

M.COM. I YEAR (First Sem) Managerial Economic

CO1: To help students to understand managerial economic and cost benefit analysis.

CO2: To help students in the performance of job.

M.COM. I YEAR (First Sem) Corporate Financial Accounting

CO1: To acquaint student corporate accounting system in corporate and global level.

M.COM. I YEAR (First Sem) Business Environment

CO1: To understand the various aspects of business environment and their impact on industry, international trade.

M.COM. I YEAR (Second Sem) Statistical Analysis.

CO1: To make students learn and understand the various application of statistical tools and techniques.

M.COM. I YEAR (Second Sem) Marketing Management

CO1: To understand the policies and procedures market and market research and analysis.

M.COM. I YEAR (Second Sem) Financial Managements

CO1: To understand basics of financial transitions applied in business and industry.

CO2: To understand various crucial decisions regarding financial aspects of business.

M.COM. I YEAR (Second Sem) Strategic Management

CO1: To acquaint students as enhance the decision making abilities of students in situations of uncertainty in dynamic business environment.

CO2: To aware students about best practices followed by business.

M.COM. II YEAR (Third Sem) Research Methodology

CO1: To understand research work concepts of research and practical implication of knowledge acquired through subject's data collection and analysis, sampling, report writing etc.

M. COM. II YEAR (Third Sem) Human Resources Planning and Development.

CO1: To expose students to the Human Resources Planning methodologies and the various aspects of HR Practices.

M. COM. II YEAR (Third Sem) Business Legislation

CO1: To update the knowledge of different business legislation in practice.

M. COM. II YEAR (Third Sem) International Marketing.

CO1: To understand the importance of international marketing, entry strategies, foreign market selection, product development and distribution.

M. COM. II YEAR (Fourth Sem) Quantitative Techniques.

CO: To understand Operational Research

M. COM. II YEAR (Fourth Sem) Securities Analysis.

CO1: To update the subject knowledge among the students at corporate level about Security and Portfolio Management.

M. COM. II YEAR (Fourth Sem) Advertisement

CO1: To expose students to the advertising basics and the various methodologies to develop, implements and measure the effect of advertisement.

M. COM. II YEAR (Fourth Sem) Project Report.

Diploma of Business Management (DBM) DBM (First Sem) Management Accounting & Applied Statistics

CO1: To update the subject knowledge of students of statistics & business.

CO2: To study the cost data relating to manufacturing companies.

CO3: To analyze the financial & cost data with the help of statistical information.

COs: DBM

DBM (First Sem) Principles of Managements

CO1: To help students to understand the basic organizational process of management and organizational behavior.

CO2: To help students in the performance of job.

DBM (First Sem) Management Information System

CO1: To acquaint student about the need of the information technology in management decision.

DBM (First Sem) E Business

CO1: To acquaint the students with the use E commerce in competing markets and business administration.

CO2: To get the knowledge of e business channels.

DBM (Second Sem) Marketing Managements

CO1: To update the subject knowledge among the students at corporate levels.

CO2: To understand the various business aspects and its impact on industry.

DBM (Second Sem) Human Resource Managements

CO1: To understand the policies and procedures followed in business regarding human resource of the organization.

CO2: To expose to current aspects like organizational behavior and industrial psychology.

DBM (Second Sem) Financial managements

CO1: This course exposes students to understand basics of financial transitions applied in business and industry.

CO2: To understand various crucial decisions regarding financial aspects of business.

DBM (Second Sem) production and operations managements

CO1: To acquaint students regarding the various concepts involves in smooth carrying for business.

CO2: To aware students regarding best practices followed by business.

DBM (Second Sem) Project report

CO1: To understand research work concepts of research and practical implication of knowledge acquired through subjects.

CO2: To understand research work concepts of research and practical implication of knowledge acquired through subjects.