PROGRAMME OUTCOMES (POs)
PROGRAMME SPECIFIC OUTCOMES (PSOs)
COURSE OUTCOMES (Cos)

MAHATMA GANDHI UNIVERSITY, NALGONDA

MAHATMA GANDHI UNIVERSITY, NALGONDA
(*Accredited with "B" Grade by NAAC*)

DEPARTMENT OF ENGLISH

PROGRAMME NAME: M.A. ENGLISH
PROGRAMME CODE: 009

MA English Programme Outcomes

- **Critical Thinking:** Apply theoretical knowledge to make a critical analysis, intervene using innovative frameworks and evaluate and follow up.
- **Effective Communication:** Engage in inter and intra personal communications, behavioural change communication and proficiency in information Communication Technology.

  Scientific Temper: To build essential skills of life including questioning, observing, testing, hypothesizing, analysing and communicating.
- **Effective Citizenship:** Demonstrate empathetic social concern and engage in service learning and community engagement programmes for contributing towards achieving of local, regional and national goals.
- **Ethics:** Recognize different value systems including your own, understand the moral dimensions of your decisions and accept responsibility for them.
- **Environment and Sustainability:** Participate and promote sustainable development goals.

  Gender Sensitization and Social Commitment: To imbibe Gender sensitivity and the sense of social responsibility for self and community for the benefit of the society at large.

  Self-directed and Life-long learning: Engage in continuous learning for professional growth and development.

MA English Programme Specific Outcomes

- To familiarise with the writers of English literature across different ages and continents, their theories, perspectives, models and methods.
- To be able to demonstrate competence in analysis and critically analyse scholarly work in the areas of English language teaching, literary research and translation.
- To enhance literary and critical thinking.
- Application of the knowledge of Literature, theories, research and skills in different fields of literary practice.
- To develop the technical skills and ethical decisions appropriate for the holistic professional development in the field.

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MA English Course Outcomes
Semester-I

Paper-I: **The English Language :History, Structure &Description – I**	A History of the English Language aims to equip students with the skills, insights and appropriate theoretical approaches necessary to analyse and describe changes in the structure of the English language from the earliest written records to the present day.
Paper-II: **English Literature of the late 16th C**	The course offers extensive insight into the history of English literature, while laying special emphasis on various literary movements, genres and writers that are held to be the representatives of the 16 th Century.
Paper-III: **English Literature of the late 16th C and Early 17th C**	Students will come to know about the 17th century as a period of unceasing disturbance and violent storms, no less in literature than in politics and society.
Paper-IV: English Literature of the 17 C	Student will be able to explore about writers like Shakespeare, Ben Jonson and John Donne left their marks, particularly in the worlds of theater and poetry.
Paper-V:English Literature of the 18th C	Students learn about English literature of the 18th century refers to literature (poetry, drama, satire, and novels) produced in Europe during this period.
SEMINAR	Students will develop persuasive speech, present information in a compelling, well-structured, and logical sequence, respond respectfully to opposing ideas, show depth of knowledge of complex subjects, and develop their ability to synthesize, evaluate and reflect on information.
Add On : Communicative English & Soft Skills	The objective of the programme is to inculcate potential skills in the learners to prepare them to deal with the external world in a collaborative manner, communicate effectively, take initiative, solve problems, and demonstrate a positive work ethic so as to hold a good impression and positive impact

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Semester-II

Paper-II: The English Language :History, Structure &Description - II	Demonstrate a critical understanding of different and sometimes conflicting approaches to the study of the history of the English language.
Paper-II: English Literature of the 19th C – I	To comprehend the development of trends in British drama and poetry. To view British literature in its socio-cultural and political contexts. To understand the theme, structure and style in British poetry and drama.
Paper-III: English Literature of the 19th C – II	Students would have understood the effectiveness of the detective fiction, fantasy/mythology and romance which have a mass appeal.
Paper-IV: English Literature of the 20th C – I	Students learn about the novels, short stories, and poetry of the early 20th century critiqued existing forms of identity, suggested new alternative forms, and provided readers with a space in which to reflect on the ways in which they might transform themselves and their surroundings.
Paper-V: English Literature of the 20th C – II	This course will explore some of the forms of British literature took during the second half of the 20th century, and it will consider the continuing relevance of these texts to our contemporary situation.
SEMINAR	Seminar engages students in the integrated activities of reading, research, discussion, and composition around a designated subject.
Add On : Human Values and Professional Ethics	The course includes salient values of life, Human rights, environment and ecology, social values & ethical values etc.

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Semester-III

Paper-I: The English Language Teaching: Classroom Techniques and Practical English	This paper enables the students knowledge about the various pedagogical applications of teaching English
Paper-II: American Literature- I	Upon completion of the course students should be able to: Analyze and discuss works of American literature from a range of genres (e.g. poetry, nonfiction, slave narrative, captivity narrative, literary fiction, genre fiction, sermon, public proclamations, letters, etc.
Paper-III: Indian Writing in English - I	Familiarising students with the trajectory of Indian writing in English
Paper-IV: (A)Postcolonial Literature	Possess a coherent knowledge and a critical understanding of postcolonial literature and its key historical, cultural and theoretical developments
Paper-IV: (B) Modern European Literature in Translation	Studets study other literatures translated into English
Paper-V: (A)Literature and Film	On successful completion of this course students will be able to:
	Gain perspective on literature's relationship with cinema
	Understand film form as language
	Learn politics and processes of adaptation
Paper-V: (B) Women‟s Writing	Students will be able to explain and participate in critical and theoretical debates surrounding women's writing at advanced undergraduate level;
Open Elective: English for Competitive Examinations	Make the students to be through with all Objective English concepts from the perspective various comeptetive exams across the country.
SEMINAR	Students will develop persuasive speech, present information in a compelling, well-structured, and logical sequence, respond respectfully to opposing ideas, show depth of knowledge of complex subjects, and develop their ability to synthesize, evaluate and reflect on information.

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Semester-IV

Paper-I: The English Language Teaching: Major Developments in L1 and L2	Students will review the grammatical forms of English and the use of these forms in specific communicative contexts, which include: class activities, homework assignments, reading of texts and writing
Paper-II: American Literature- II	Describe the major conventions, tropes, and themes of Puritan and early American literature; identify and discuss those features with regard to individual works
Paper-III: Indian Writing in English - II	Familiarising students with the trajectory of Indian writing in English
Paper-IV: (A)Academic Writing and Research Methodology	Upon successful completion of this course, students should be able to: research any academic assignment using a range of appropriate resources. Understand the difference between documentation, citation, and referencing. Construct coherent arguments in writing.
Paper-IV: (B) Modern European Literature in Translation	Studets study other literatures translated into English
Paper-V: (A)Fourth World Literature	Fourth World literature refers to the written work of native people living in a land that has been taken over by non-Natives.
Paper-IV: (b)Project Work	Students develop critical reading and writing skills and learn to recognize that effective thinking and writing about texts must be informed by knowledge about relevant local, global, and disciplinary contexts besides fosering research skills in language and literature
(B)South Asian Literature	Students will be able to: - understand and interpret South Asian literary works. - evaluate the relationship between texts and their cultural and historical contexts; - critically evaluate translations of South Asian literature; - critically evaluate scholarly work relating to South Asian history and culture;

SEMINAR	Students will develop persuasive speech, present information in a compelling, well-structured, and logical sequence, respond respectfully to opposing ideas, show depth of knowledge of complex subjects, and develop their ability to synthesize, evaluate and reflect on information.

B.TECH(ALL PROGRAMMES)

English for Enhanced Competence (For all students of Semester-I & II UG Courses under the jurisdiction of Mahatma Gandhi University) Including Integrated Pharmaceutical Chemistry and Integrated Business Management Students of the university.

Paper-I: English for Enhanced Competence	**Students should be familiar with representative literary and cultural texts within a significant number of historical, geographical, and cultural contexts. Students should be able to apply critical and theoretical approaches to the reading and analysis of literary and cultural texts in multiple genres. Students should be able to identify, analyze, interpret and describe the critical ideas, values, and themes that appear in literary and cultural texts and understand the way these ideas, values, and themes inform and impact culture and society, both now and in the past.**

English for Enhanced Competence (For all students of Semester-III & IV UG Courses under the jurisdiction of Mahatma Gandhi University) Including Integrated Pharmaceutical Chemistry and Integrated Business Management Students of the university.

Paper-II: English for Enhanced Competence	**Students should be able to write analytically in a variety of formats, including essays, research papers, reflective writing, and critical reviews of secondary sources. o Students should be able to ethically gather, understand, evaluate and synthesize information from a variety of written and electronic sources. o Students should be able to understand the process of communicating and interpreting human experiences through literary representation using historical contexts and disciplinary methodologies.**

B.Tech English for Semester -I (EEE) Semesster-II (CSE & ECE) (Theory and Lab)

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1. Use English Language effectively in spoken and written forms.
2. Comprehend the given texts and respond appropriately.
3. Communicate confidently in various contexts and different cultures.
4. Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

B.Tech English for Semester -V (ECE) Semesster-VI (CSE) Semester-VII (EEE) Technical Communication and Soft Skills (Theory and Lab)

Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills. Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus. Develop study skills and communication skills in formal and informal situations.

MCA Semester-I Soft Skills Lab

The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.

UG General English Programme Outcomes

Students should be familiar with representative literary and cultural texts within a significant number of historical, geographical, and cultural contexts. o Students should be able to apply critical and theoretical approaches to the reading and analysis of literary and cultural texts in multiple genres. o Students should be able to identify, analyze, interpret and describe the critical ideas, values, and themes that appear in literary and cultural texts and understand the way these ideas, values, and themes inform and impact culture and society, both now and in the past. o Students should be able to write analytically in a variety of formats, including essays, research papers, reflective writing, and critical reviews of secondary sources. o Students should be able to ethically gather, understand, evaluate and synthesize information from a variety of written and electronic sources. o Students should be able to understand the process of communicating and interpreting human experiences through literary representation using historical contexts and disciplinary methodologies.

MAHATMA GANDHI UNIVERSITY, NALGONDA
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DEPARTMENT OF ECONOMICS
PROGRAMME NAME: M.A. ECONOMICS
PROGRAMME CODE: 313

S.no	Area	M.A. ECONOMICS - Programme Outcomes
PO1	**Critical Thinking:**	After completing the Post Graduation in Economics, the student will be able to understand why there are differences in the distribution of income across the sections of the society. Probably the student also understands the reasons for unequal distribution and would try to find the solution to this menace in the form of policy prescription.
PO2	**Effective Communication:**	The student will be able to speak out on the Growth rate of various sectors in the Economy, local, national & international levels. The same will be shared with the Society in educating people.
PO3	**Social Interaction:**	As part of the Project Work students have to interact with the Society for collection of information on the research topic on which they work. For probing the research question the student invariably interacts with the respondents.
PO4	**Effective Citizenship:**	After completion of the Programme there would be a change in the Economic Behaviour of the student, same will be reflected in the family and influences the society for the same change contributing to the nations development.
PO5	**Ethics:**	The student appreciates the prudent decision they shall always be a rationale person.
PO6	**Environment and Sustainability:**	The student understands the importance of the sustainable development of the economy and hence will contribute to the same.
PO7	**Self-directed and life-long learning:**	The subject of Economics is dynamic in nature and hence one has to continuously learn the changes taking place in the economy.

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S.no	Area	M.A. ECONOMICS - Programme Specific Outcomes
PSO1:	**Knowledge:**	Understand the behaviour of Local, National and International Economy.
PSO2:	**Analysis:**	Analyse Micro & Macroeconomic policies of Regulatory Authorities, State & Central Governments and the International Bodies.
PSO3:	**Application:**	By statistical methods the student would estimate National Income Determine, Poverty, inflation, unemployment, Balance of Payments, etc.
PSO4:	**Decision:**	The Decision of the student is always influenced by the cost-benefit analysis based on economic principles

Semester – I

Course	Course Outcomes
Micro Economics-I	➢ By the end of the course, the student should be conversant with the fundamentals of microeconomics and have developed the analytical abilities necessary to examine issues in economic policy. To give a taste of diverse applications, examples and exercises would be provided. ➢ Students will have a better understanding of how different economic agents operate optimally in light of limited economic resources and other restrictions. The theoretical and applied components of economics are more readily understood by students. Students will be better equipped to describe social reality with better arguments and ideal solutions if they have a thorough understanding of microeconomics.
	➢ By the completion of this course, the student will be able to comprehend the many techniques for estimating

Macro Economics-I	national income and its flow from one sector to another, based on secondary data from a variety of sources. In addition, students will explore the practical, methodological, and societal issues associated with national income estimation. - Furthermore, students will be familiar with the various theories of consumption and investment and will be able to empirically test these ideas using the relevant estimation and interpretation techniques. Moreover, students will acquire both theoretical and empirical knowledge of the money supply and its associated concepts. Using theory, statistics, and methodologies about money demand in India and other nations, students will also study money demand challenges and changes in the factors affecting money demand.
Quantitative Methods-I	- By the end of this course, students will be familiar with the many types of functions and their applications in economics, as well as the maxima and minima of functions. In addition, the student will become acquainted with statistical theory and its application as the basis for data analysis, as well as fundamental and advanced approaches from the field of operations research. - In addition, the course should include instruction in the analysis and interpretation of data, as well as practical experience in each of these areas. Students would acquire the information necessary to interpret examples of methods for summarizing data sets, such as standard graphical tools and summary statistics. Students would learn the basics of probability, random variables, and how a sample of a statistic is distributed.
4 a) Agricultural Economics	- By the end of this course, students will have gained knowledge of agricultural background, farm and agro-business activities, agriculture finance, and management. It introduces the learner to the applied part of economics instead of the theoretical, which deals with the allocation of land under various crops, specialization, diversification, and other policy amplifications. - The course offers relevant production and various techniques to understand agriculture production, cost-

	benefit analysis, and enhance learners to make frontier-production function at least cost. This course also provides knowledge about the theoretical background and practical issues confronting agriculture's pricing policy and marketing strategies, with special reference to India.
4 b) Computer Applications-I	▪ By the end of this course, the student will know the basics of computers and how they can be used in economics. The student will be in a position to operate the computers for his research and further studies.
5 a) Industrial Economics-I	▪ On the successful completion of this course, the student will gain familiarity with theories of industry location and they will be able to suggest to the concerned authorities and to their employer where to establish an industry and how it is financially viable for the entrepreneur. The students are also able to understand growth theories of firms and suggest ways to grow a firm by using the theoretical and empirical knowledge gained from this course. ▪ In addition, students become familiar with the application of market concepts in industrial economics and, based on this knowledge, they will be able to suggest which market conditions and market strategies would be beneficial to an industrialist. Students learn how to maximize profits using profit maximization criteria, how to use available resources efficiently, and how to conduct a clear analysis on the benefits and costs of establishing an industry and investing in it using various cost-benefit analysis criteria.
	▪ On the successful completion of this course, the student will be able to provide the basics of financial economics. More specifically, students are able to assess the financial system, structure, and investment institutions at the state and national level.

5 b) Financial Economics-I	➢ They can also assess the relationship between the financial system and economic development. Students will become familiar with the banking structure in India and the financial sector reforms and reforms related to stock markets. ➢ Students gain knowledge about the basics of capital markets and money markets in an Indian context, and finally, they will be able to use this knowledge whenever they invest money in the markets.

Semester - II

Course	Course Outcomes
Micro Economics-II	➢ This is the second part of the core microeconomics sequence. By the end of this course, students will be able to understand and apply different theories of firm, profit maximization, and sales maximization in the context of given constraints both theoretically and empirically. ➢ In addition, students are also able to become familiar with theories of distribution, general equilibrium, welfare economics, economics of uncertainty, and information economics and their uses in solving the problems that arise in an economy so that they can suggest ways to maximize public welfare using this theoretical knowledge.
Macro Economics-II	➢ In addition to the knowledge gained in the core course Macroeconomics I, on the successful completion of this course, the student will be able to understand the post-Keynesian theories of demand for money and examine the theories for different countries using secondary data. ➢ Students will also be able to gain knowledge related to the simultaneous determination of interest rates and output using the IS-LM framework, and they will be able to extend this analysis to international trade, balance of payments, and government sectors. ➢ Furthermore, based on the theoretical analysis in the course, students will become acquainted with the causes of inflation, business cycles, and their determinants, and will apply and empirically verify those causes with available secondary data. Lastly, the students will be able to know the theoretical background of supply-side economics principles, forming expectations (rational and adaptive),

	and their usage and estimation in macroeconomics.
Quantitative Methods-II	➢ This course is a continuation of Quantitative MethodsI, the introductory course. Students will obtain the theoretical knowledge and practical application of determinants, matrices, simultaneous equation methods, and optimization approaches in the field of economics at the conclusion of this course. ➢ In addition, this course would enhance students' theoretical comprehension and practical application of time-series modelling and probability analysis in economics. ➢ In addition, students become acquainted with sampling procedures and their proper application in future research endeavors. Students will be able to choose the right sampling method based on what they have learned in this course.
4 a) Agri-Business	➢ Students will comprehend and assess contemporary agricultural events and concerns, as well as their impact on the development of agriculture. Students will also be able to recognize and analyse the relationships between the inputs and outputs of agriculture. This will help them make decisions that are effective and profitable. ➢ Students will also be able to look at the effects of trade policy, common markets, trading blocks, market volatility, commodity problems, trade agreements, and environmental rules on imports and exports in international trade. This will help them make better decisions about production. ➢ In addition, students will comprehend how all facets of agriculture are utilized by scientists, marketers, and farmers. Students will understand how the qualities of an employer and the different stages of making decisions affect the success of an agricultural business.
4 b) Computer Applications-II	➢ This is a continuation of the Computer Applications I course. Students who successfully complete this course will be able to enter data, code or label it, save it, and retrieve it. ➢ In addition, students are able to process data, calculate descriptive statistics, and estimate various functions using existing data. Students are also familiar with the SPSS software after its installation and how to utilize it to collect the necessary statistics for their analysis or the identified problem using the proper approaches learnt in previous courses.

5 a) Industrial Economics-II	▪ This course is a continuation of Industrial Economics I; hence, by the end of this course, students will be familiar with a variety of India-related industrial concerns in addition to the knowledge learned in the former course. ▪ In particular, students will be able to understand the performance of India's industrial sector and its issues and developments. Students will be able to comprehend the financing patterns of the Indian industrial sector, its privatization issues, and the positive or negative effects of privatization on the Indian economy. ▪ Students can also use different statistical methods to evaluate the balance sheets, losses, earnings, debts, etc. of Indian businesses.
5 b) Financial Economics-II	▪ On the successful completion of this course, the student will be well equipped with the knowledge of how stock exchanges will take place in a stock market and the role of SEBI in primary and secondary markets. ▪ Furthermore, students are able to understand the significance of insurance and its practical advantages and apply them in real life by knowing the insurance types and providing institutions. Lastly, students are also able to understand the importance of mutual funds and the current Indian financial system, its challenges, and advantages.

Semester – III

Course	Course Outcomes
Econometrics-I	▪ On the successful completion of this course, the students will be familiar with the fundamental econometric techniques widely used in empirical work in economics and related fields. It addresses estimating and inference challenges in the context of single and multiple equation regression models. ▪ The other outcome is rather than focusing solely on formal theoretical proofs, the emphasis is on conceptual understanding and "hands-on" applications using economic data collected from real-world instances. ▪ Finally, the students should be able to make simple econometric models and understand the econometric and statistical results from other studies.
	▪ By the end of this course, students will gain a deeper understanding of the broad principles and theories that tend to govern the flow of trade in goods, services, and

International Economics	capital, both short-term and long-term, at the global level. - Further, the students will be able to understand the theory and nature of the subject, which, in turn, will greatly help them to examine the impact of the trade policies followed both at the national and international levels as well as their welfare implications at a macro level and the distribution of gains from trade, with particular reference to India. - Finally, in this age of globalization, studying the paper will teach students about the likely effects on income, employment, and social standards, as well as about possible policy solutions.
Public Economics	- On the successful completion of this course, students will gain familiarity with the rationale for and role of government intervention in economic activities and how the government makes economic decisions. The course will examine the recent developments in both theoretical and empirical literature in the area. - The Indian case studies will be discussed in detail for a better familiarity with Indian public economics. The students will learn both in theory and in practice about how taxes work, how debt works, and how public goods and services are provided. - Using the empirical results, the students will provide recommendations to the government on several issues related to government policies.
4 a) Economics of Social Sector	- On the successful completion of this course, students will gain an understanding of key concepts, issues, theories, and models relating to the economics of education, as well as empirical evidence on and policy implications of those theories and a deeper understanding of recent research activity. - Further, students understand methods used by economists to evaluate education policies; understand and model the Education Production Function; define the return to education and understand its implications; and understand methods used by economists to evaluate education policies. - Students can also learn about health and health care theories, the fundamentals of health economics, and contemporary developments in the state and national health care sectors. They can accomplish this by

	conducting an empirical analysis using both primary and secondary data sets.
4 b) Economics of Insurance-I	▪ Explain insurance risk management and insurance mechanism comprehension. Students will be able to learn the basic concepts of insurance economics and they also, they figure out what could go wrong with properties, people, business processes, and finances if something goes wrong. ▪ In addition, students apply their knowledge of current information, models, techniques, and practices in all of the major business disciplines; compare various types of insurance plans as well as the significance of contracts to customers, and develop insightful perspectives on an overview of life insurance and general insurance products.
5 a) Demography	▪ This course offers a comprehensive grasp of the relationship between demographic changes and economic growth. By emphasizing both quantitative and qualitative elements and traits of the human population as well as population processes, students are able to get a thorough understanding of the most recent advances in demography theories and methods. ▪ The course also equips students with a firm grasp of the fundamentals of demography as well as significant demographic challenges and illustrations in the Indian context. This is also to comprehend the health care marketthe government's role and market failures. ▪ Students will investigate the distinction between demography and population studies; the many concepts of demography; the relationship between population increase and economic development; population theories; population policies; and international population data comparisons.
5 b) Development	▪ By the end of this course, students can explain inequities between rich and poor countries, how the gaps have grown over time, and how various assessments of quality of life interact with per capita income. This can explain the concept of economic growth. ▪ Students will be able to understand many theories of growth and development and analyse their applicability and practicality to the diverse economies in the world. Students are also able to understand and apply the theories and critically assess them. Students will also

Economics	empirically investigate all those theories of development outlined in the course. - More specifically, students will be able to apply the theories of development and growth to emerging countries like India and grasp the theories' difficulties and potential. Furthermore, students will gain a broad awareness of the drivers of economic development through studying the growth and development theories presented by various economic schools.

Semester – IV

Course	Course Outcomes
Econometrics-II	- In addition to what they learned in Econometrics I, by the end of this course, students will be able to understand advanced econometrics methods theoretically and empirically, which include simultaneous equation models, dynamic econometrics models, time series econometrics, elasticities for different functions in micro and macroeconomics, agricultural economics, public economics, etc. - Students will also learn the difference between models built in this course and simple models estimated and interpreted in a basic econometrics course. Students will also become familiar with qualitative response models and their usage whenever they have cross-section data that is qualitative in nature, both theoretically and empirically. - Students will also be able to select an appropriate econometric technique for the problem based on their data set. Because the time series models and cross-section data-related models are explained in this course. Students will be able to use the software to estimate the models and figure out what the results mean based on what's already been written.
Indian	- On successful completion of this course, students will be able to: have a comprehensive understanding of India's economic growth trajectory, economic policies, and institutional reforms. - Students will be able to understand trends, causes, and consequences of poverty, inequality, unemployment, and inflation in India both theoretically and empirically; and the determinants of these problems in a country like

Economy	India. Using this knowledge, students will be able to assess existing government policies and provide alternative ways to come out of the problems. - The students will possess an in-depth study of the contributions of India's agriculture, industrial, and service sectors; and the students will also comprehend the specifics of fiscal and monetary policy and their application in the Indian economy to overcome the economic irregularities.
Environmental Economics	- On the successful completion of this course, students will be conversant with the economic principles, theories, and concepts that form the basis of environmental economics and assess their application using data at national and international levels. - Students become familiar with the analytic tools used in analyzing environmental and natural resource management problems. Students will also be acquainted with both non-market and market models of resource valuation both theoretically and empirically; they will be able to assess and evaluate the applicability of various solutions and policies.
4 a) Research Methodology	- On the successful completion of this course, student will be able to demonstrate knowledge of research processes (reading, evaluating, and developing), performs literature reviews using print and online databases. Further, students able to identify, explain, compare, and prepare the key elements of a research proposal/report. - Additionally, students will familiarize with define and develop a possible research interest area using specific research designs and compare and contrast quantitative and qualitative research paradigms, and explain the use of each in their research. Students also describe, compare, and contrast descriptive and inferential statistics, and provide examples of their use in their research and describe sampling methods, measurement scales and instruments, and appropriate uses of each.
4 b) Economics of Insurance-II	- Students will understand the need of the insurance to mitigate the risk and uncertainty of the life and others. - Students will familiarize with various insurance plans including retirement plan. - Students also understand the insurance regulation theories and their application.
	- On the successful completion of this course, the students will be exposed to the concepts and models related to

5 a) Economics of Infrastructure	Infrastructure and understand basic Economics theories and models required for infrastructure sector understanding. - Further, students will be able to demonstrate clear understanding of concepts Infrastructure economics and policy. Lastly, students will exhibit the ability to integrate technical, economic, social and regulatory frameworks for Infrastructure sector planning and resource management.
5 b) Project Work	- To develop the ability to prepare research proposal and complete the research report. - To develop the skills of collection of information, compilation and analysis of it. - To develop the report writing skills.

MAHATMA GANDHI UNIVERSITY, NALGONDA
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PROGRAMME NAME: Ph.D. ECONOMICS
PROGRAMME CODE: 334

Programme Outcomes (POs)

S. No	Area	Programme Outcome
PO1	Critical Thinking	The main Purpose of the Ph.D. program is to train students to become independent researchers by identifying interesting questions to find creative solutions with their critical thinking.
PO2	Effective Communication	Research results have to be communicated to the society to gain benefit out of it for which the scholars need to develop effective communication.
PO3	Social Interaction	Since the research is carried on society problems the scholars have to interact with people to gain knowledge about the problem facing by the people.
PO4	Effective Citizenship	Research scholars do research on society issues in economics they automatically become an effective citizens in the society.
PO5	Ethics	Ethics is one of the important aspects of research. We focus on following ethics by scholars while carrying out their research work. It is in literature review, models and techniques' using and analysis of research aspects.
PO6	Environment and Sustainability	The research work carried by scholars will contribute to the development of research environment in the department and helps in sustaining the future endeavors.
PO7	Self-directed and life-long learning	We develop the research scholars to carry the research work independently which will enable them to carry the research throughout their life time.

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Programme Specific Outcomes (PSOs)

S. No	Area	Programme Specific Outcomes
PSO1	**Knowledge**	**Students acquire the knowledge of various methods of research in economics, literature review procedure, data collection methods, data compilation, generation of tables, analysis of data, interpretation of results and how to use some of applied statistical and econometric tools in research.**
PSO2	**Analysis**	**Analysis is one of the key aspects of research in economics. The worth of research work depends on method of analysis of the aspects in research. So, the research scholars pay out most attention on the analysis of research results.**
PSO3	**Application**	**Research scholars in economics will carry the research on cotemporary issue of the economy and these results applied in taking policy decision by the government and other private organizations.**
PSO4	**Decision**	**A student who does research in economics can take better decisions in their real life on economic issues and also it may help them to take decisions in their professions. Further, research will help the government and private organization to take policy decisions in their business activities.**

MAHATMA GANDHI UNIVERSITY, NALGONDA

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Course Outcomes (COs)

S. No	Area	Course Outcomes
CO1	**Research Methodology**	**Develop competency in Designing the Schematic Research Proposal including outlining of problem statements,** **• flagging of research issues from literature,** **• outlining of research objectives & approach,** **• structuring of research questions,** **• structured research hypotheses,** **• chapter- structuring** **• thematic- research frame works,** **• JEL classification & research keywords** **• Acquire knowledge and skill in identifying the parts of a Literature,** **• review including: chronological VS thematic structuring,** **• analysis and idea-development,** **• identification of research gaps,** **• research-citation,** **• indexing & referencing designs**
CO2- A	**Agriculture and Rural Development**	➢ **Understand the importance of agriculture in rural and Industrial development.** ➢ **Effects of technology on wages, production & productivity,** ➢ **Farm mechanization, labour absorption, agricultural development, food security and inclusive growth.** ➢ **Identifies the relation between agriculture development and rural development, MGNREGS and its impact on rural development and agriculture development.**
CO2-B	**Industrial & Environmental Studies**	❖ **Research scholar understands the pattern of Industrialization, growth, changes in industrial policy.** ❖ **Scholar will be able to classify the industries and identifies growth of industries and factors responsible for it.** ❖ **Industries effect the environment, how that environment is assessed? Different methods of assessment.** ❖ **Understand the laws that are protecting environment for sustainable development.**

MAHATMA GANDHI UNIVERSITY, NALGONDA

(*Accredited with "B" Grade by NAAC*)

DEPARTMENT OF SOCIAL WORK

PROGRAMME NAME: M.S.W.

PROGRAMME CODE: 310

M.S.W. - PROGRAMME OUTCOMES	
PO1: CRITICAL AND REFLECTIVE THINKING	The student is supposed to acquire the ability of identifying basic assumptions and frame reflective critical and comprehensive thinking and action which can frame his intellectual, institutional and personal perspective.
PO2: EFFECTIVE COMMUNICATION	The students will be able communicate with people without fear and loose stage fear.
PO3: SOCIAL INTERACTION AND RESPONSIBILITY	To obtain a synoptic view regarding disputes and des agreements and help to reach conclusions in social and institutional proofs.
PO4: EFFECTIVE CITIZENSHIP	Demonstrate genuine social concern and democracy-based equity cantered national development for the participation in civic and cultural life.
PO5: ETHICS	Recognize fundamental value systems of Indian culture and understand as well as implement moral and spiritual dimension which enable the student to accept concern responsivities.
PO6: ENVIRONMENT AND SUSTAINABILITY	Understand the issues of environmental and ecological matters and acquire a commitment for sustainable development.
PO7: SELF-DIRECTED AND LIFE-LONG LEARNING	Acquire the ability to engage in independent and life-long learning in the broadest context socio-technological changes.

M.S.W. - PROGRAMME SPECIFIC OUTCOMES	
PSO1	Student understands the history and Concept of social work and Methods of Social Work too. This incorporates computer application also
PSO2	The student acquires effective knowledge and skill of Human Resource Management
PSO3	Application of the concepts learnt to the practical situtaion
PSO4	The student gets sight in urban and industrial development together with co-operative social responsibility

M.S.W. - COURSE OUTCOMES	
SEMESTER – I	
MSW 1: CORE - I Social Work Profession, Philosophy and Ideology	To acquitted the students with Social Work History, Values of Social Work and Principles
MSW 2: CORE - II Social Case work	To enable the students to understand Individual's Psycho-Social problems and help them to solve themselves.
MSW 3: CORE - III Observational Visits	To acquaint the students with various social issues in society
MSW 4: ELECTIVE - I IV (a) Social Policy and Planning	To help the students to understand policy framing and implementation.
MSW 4: ELECTIVE -	To help the students, in organizing the NGOs

I IV (b) **NGO Management**	
MSW 5: ELECTIVE - II V (a) **Social Development and Sustainable Development**	To enable the students to understand Globalization, Liberalization and Privatization and its importance in social development
MSW 5: ELECTIVE - II V (b) **Legal Systems and Social Legislations in India**	To acquaint the students with Indian Constitution, acts, legal system and social legislations
SEMESTER – II	
MSW 6: CORE - I **Individual and Society**	To enable the students to understand the society, conflicts and relationship of the individual with society and its importance
MSW 7: CORE - II **Social Group Work**	To enable the students to work with group of people having similar issues and help them to help themself to cope with their problems
MSW 8: CORE - III **Concurrent Field Work**	To familiarize the students with issues, acts, schemes related to women and children welfare rural community, rural people issues and application of classroom learnings
MSW 9: ELECTIVE - I IV (a) **Counselling, Theory and Practice**	To acquaint the students with counselling process and practice
MSW9 : ELECTIVE - I IV (b) **Women and Child Welfare**	To familiarize the students with issues, acts, schemes related to women and children welfare

MSW 10: ELECTIVE - II V (a) Dynamics of Human Behavior	To familiarize the students with general psychology of humans and changes in their behaviour
MSW 10: ELECTIVE - II V (b) Human Resource Management	To understand HRD System Organisational development
MSW 11: Mini Research / Project Report	To acquaint the students research process
SEMESTER – III	
MSW 12: CORE - I Community Organization and Social Action	To help the students to understand community, working with rural, urban and tribal communities, application of PLA techniques in Community Organisation and importance of social action in transforming the society.
MSW 13: CORE - II Social Work Research	To acquaint the students with research process and various data collection methods & tools
MSW 14: CORE - III Concurrent Field Work	To help the students to practice the classroom knowledge in Rural/Urban/Tribal community development/Psychiatric setting/Medical setting/ Community Health
MSW 15: ELECTIVE - I IV (a) Urban Community Development-I	To familiarize the students with urbanization, Industrialization, urban community development and urban municipal administration
MSW 15: ELECTIVE - I IV (b) Psychiatric Social Work – I	To acquaint the students with historical development of psychiatric social work history and clinical assessment and diagnosis of psychological disorders

MSW 15: ELECTIVE - I IV (c) Management Information Systems	To develop the management information system skills in the students and handling of various hardware and software related to MIS
MSW 16: ELECTIVE - II V (a) Rural and Tribal Community Development – I	To familiarize the students with rural sociology, Panchayati raj system, land reforms, tribal movements, rural and urban development
MSW 16: ELECTIVE - II V (b) Medical Social Work & Community Health – I	To familiarize the students with Community Health, Health care systems in India and National Health Programs
MSW 16: ELECTIVE - II V (c) Labour Legislations	To familiarize the students with various labour acts
MSW 17: (ID Paper) Corporate Social Responsibility	To familiarize the students with Govt. Policies & Guidelines to CSR
MSW 18: Dissertation	To develop the report/project/thesis writing skills and procedure in the students
SEMESTER – IV	
MSW 19: CORE - I Social Welfare Administration	To acquaint the students with Evolution of social welfare administration and its Tools and techniques, Administration of institutional and non-institutional programmes and Accountability in social welfare organizations
MSW 20: CORE - II Social Statistics	To familiarize the students with various data analysis methods, data analysis packages, Descriptive and Inferential Statistics.

MSW 21: CORE - III Concurrent Field Work	To help the students to practice the classroom knowledge in Rural/Urban/Tribal community development/Psychiatric setting/Medical setting/ Community Health related to their specialization opted
MSW 22: ELECTIVE - I IV (a) Urban Community Development-II	To familiarize the students with Unorganized sector, Urban basic services programme, Urban problems, Urban Development Authorities and imporatnace of Peoples participation
MSW 22: ELECTIVE - I IV (b) Psychiatric Social Work – II	To acquaint the students with differentiation between normal & abnormal behaviour, social work practice in mental health setting, Personality Disorders, Developmental disorders, Behaviour therapy in social work practice and Substance related disorders
MSW 22: ELECTIVE - I IV (c) Organization Development & Behaviour	To help the students to understand Organisational development and develop the skills of conflict resolution, negotiation skills and employee participation and changing organisational climate
MSW 23: ELECTIVE - II V (a) Rural and Tribal Community Development – II	To acquaint the students with SHGs, Watershed Management, Tribal Development and Planning, Vana Samrakshana Samathis and Development of tribes and weaker sections
MSW 23: ELECTIVE - II V (b) Medical Social Work & Community Health – II	To familiarize the students with Social Work in Health Care Management, Nutrition and Health, Malnutrition and Nutritional Problems, International Health, Disability and social work and Health care during disaster situations
MSW 23: ELECTIVE - II V (c) Industrial Relations &	To familiarize the students with Industrial relations, Labour management, Industrial related laws and Labour welfare

Labour Welfare	
MSW 24: Block Placement	To develop professional attitude conductive to deal with human problems, the students are placed in various institutions/organisations based on the students specialised subjects to develop sensitivity towards the needs and problems of individuals and families. To develop an understand functions of an institute and understand the role of social workers in different settings

MAHATMA GANDHI UNIVERSITY, NALGONDA
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DEPARTMENT OF HISTORY
PROGRAMME NAME: M.A. HISTORY & TOURISM
PROGRAMME CODE: 316

M.A. HISTORY & TOURISM - PROGRAMME OUTCOMES (POs)

S.no	Area	
PO1	**Critical Thinking:**	The students of History and Tourism after completing their course they could think of what was happen in the society in the past, what is happening now and likely to happen in future. With this critical thinking students can build the better society for tomorrow.
PO2	**Effective Communication:**	As part of the course these students visit to the different historical places to know its historical importance. While doing so they interact with many people by whom their communication will be improved and they may become effective communicators.
PO3	**Social Interaction:**	As part of the course students will visit to different Tourist places where they interact with many people to learn about such places.
PO4	**Effective Citizenship:**	Since students study the history of Local, National and World they could better understand society and can becomes effective citizen to improve the society progress.
PO5	**Ethics:**	The student study about different rulers and their administration systems under which people lived happily on unhappily. From this experience students learn ethics.
PO6	**Environment and Sustainability:**	The students understand the importance of environment in the past and present definitely work for the sustainable development of environment for the sake future society also.
PO7	**Self-directed and life-long learning:**	The subject matter of History and Tourism is vast and one cannot learn this subject in a short span of time. It is a continuous process of learning to understand the history on their individual pace and interest.

	Area	Programme Specific Outcomes
PSO1:	**Knowledge:**	Students of History and Tourism develop the knowledge of Local, National and International History and also about Tourism places that are situated at Local, National and International level.
PSO2:	**Analysis:**	Analyze thechronology of the history to come to an understanding of the past. While doing so compare various rulers' administration that was experienced by people in the past.
PSO3:	**Application:**	Students will describe historical events from multiple perspectives. · Students will formulate, sustain, and justify a historical argument using original ideas.
PSO4:	**Decision:**	Students take decision on what kind of society to be built for tomorrow for a better life to lead by people.

M.A - HISTORY AND TOURISM- COURSE OUTCOMES	
SEMESTER – I	
HIS-101: CORE-I HISTORY OF INDIA(FROM EARLIEST TIME TO 1000.A.D.)	**The paper highlights to know and understand the students to evolution of sources of Ancient Indian history Geography and, species and their occupational habitats. It also discusses the knowledge of metals and specialization of pre- history of India, the section deals with the political development, societal norms and cultural upheaval of Civilization, Harappan Civilization, Rig Vedic and Later Vedic Civilization. It also highlight the democratic and republican states, Mauryan age and Guptas scientific and technological innovation of Harsha Vardhana, The Rajputs Bhakti movement-Sufism in South India. Learning Outcomes: To Identify and define various kindsof sources and understand how history books are shaped After the completion of the course, students will be able to understand the origin and development of different Ancient**

	Civilizations which would provide them an idea to develop a linkage between ancient periods and contemporary situations.
HCT- 102: CORE - II HISTORY AND CULTURE OF TELANGANA(FROM EARLIEST TIME TO 1000.A.D.)	**The paper History and cultural of Telangana discusses the sources to construct the historicity throughout the era. It highlights the evolution of epic literatures and religious movements. The paper focused source of ,Geography of Decan, pre-history, Satavahanas their culture temple architecture, religious trends, education, folklores and performing arts. Also, it deals with the cultural contribution of the religious conditions of Vakatakas,Vishnukundis-Ranadurjayas, Rastrakutas, Chalukyas, Kakatiyas Society, Economy, Art and Architecture. Learning Outcomes: The students will know about the richness of the Telangana culture during the ancient period. They can understand the basic concepts associated with the different aspects of socio- cultural life of the above-mentioned period and also know the Society, Economy, customs, traditions, languages, literature, art and architecture. They will be able to know how culture of Telangana society influenced that of the other contemporary cultures.**
HMW-103 - CORE - III HISTORY OF MODERN WORLD(1453-1870.A.D.)	**The paper deals with transition of socio-religious atmosphere from the medieval orthodoxy to the modern renaissance and enlightenment days. Consequently, the American Revolution and French Revolution led the emergence of the era of revolution and the rise of Napoleon Bonaparte. The rise of nationalism in Italy and Germany as well as the democratic parliamentary reforms were discussed in the paper. The paper also analyses industrial revolution in Europe, the rise of capitalism, socialism, imperialism and free trade system. Learning Outcome: The paper resulted with the emergence of revolutionary movements, notion of nationalism and liberation all over Europe. It highlights the parliamentary reform and the scientific revolution of the time. It enlightened the era of revive of old antiquity along with modern trend of capitalism, socialism, imperialism**
TM-104 CORE-IV TOURISM MANAGEMENT	**To understand fundamentals of tourism from the management, marketing and financial perspectives. To understand the concepts of travel and tourism, the framework of the system, types and form of tourism as well as the impacts of tourism. To describe the different types tourism resources of India, their importance in tourism and management.**

TP-105: CORE-V TOURISM PRODUCTS	**To analyse the nature and basic concepts understand and can identify tourism products how to know the components of tourism products understand the central, peripheral services and public services in tourism products. understand the role of Indian architectural heritage in the tourism industry, know and apply the knowledge of Museums, art galleries and libraries, Fairs and festivals of India. understand the role of handicrafts and textiles in tourism, the key features of Indian handicraft industry. understand importance of passport and the legalities involved in it, the importance and apply the concept of visa..**
SEMESTER – II	
HIS- 201: CORE HISTORY OF INDIA(1000-1757.A.D.)	**This course forms the first part in the study of Medieval Indian History. The chief objective of this course is to acquaint students with the political, socio-economic and cultural history of Medieval India during the Sultanate period. Learning Outcome: After the completion of the course the students will have a fair understanding of various sources for reconstructing history of Delhi Sultanate as well as works and measures of important Delhi Sultans. Student will be able to formulate basis of modern India through different concepts like modernity, Rule of Law etc.**
HCT- 202: CORE HISTORY AND CULTURE OF TELANGANA(FROM 1324 to 1948.A.D.)	**It has strong historical foundations for specific Telangana concept and assets. He opined that proving the fact that the formation of a new state is not just a sentiment along with historical evidence is a key aspect in the reconstruction of the history of Telangana. History needs to be recorded developed in the 16th century, the Golconda style is an old method of blending foreign techniques. A dash of bright gold and white colour is used in the Golconda style. The Hyderabad style emerged in the 17th century under the influence of Nizams. The Art, Culture and Traditions of Telangana is a fusion of the Telugu and Persian culture dating back to the Nizams and Mughals.**
HMW -203: CORE HISTORY OF MODERN WORLD(1871-1956.A.D.)	**The paper highlights the period from First World War to Second World War. It includes the Paris Peace Conference, League of nation and several security conferences. It discusses economic depression and Ne Deal, economic and political aspects of Russian Revolution, rise of totalitarianism and nationalism and foreign policies of different countries. It deals with the problem of disarmament and policy of appeasement, which led to another world war. Learning Outcomes: The paper highlights the political and diplomatic changes in the two-world war era. Academicians get the privilege to know**

	about economic evolution, political and diplomatic upheaval of the time. The ear of non-armament and the policy of appeasement are also known to the readers.
TA- 204: CORE TRAVEL AND ACCOMMODATION	**Travel and Accommodation is a fundamental part of travel and tourism and an essential element of the tourist's experience. However, searching for a suitable place to stay can be frustrating due to the vast selection of accommodation options from a camping ground to a luxury and include getting an overall understanding of accommodation types, studying hotel type of lodging in more details, as well as its operational environment, special characteristics and principal challenges that accommodation sector faces. Afterwards, the phenomenon of" sharing economy" within the scope of accommodation industry is introduced.**
TM- 205: CORE TOURISM MARKETING	**Discuss and communicate the management evolution and how it will affect future managers. We Observe and evaluate the influence of historical forces on the current practice of management. To Identify and evaluate social responsibility and ethical issues involved in business situations and logically articulate own position on such issues. The Explain how organizations adapt to an uncertain environment and identify techniques managers use to influence and control the internal environment. To Practice the process of management's four functions: planning, organizing, leading, and controlling. To Evaluate leadership styles to anticipate the consequences of each leadership style.**
SEMESTER – III	
HMI- 301: CORE HISTORY OF MODERN INDIA(1757-1950.A.D.)	**The paper highlights the British Imperialism and the opposing conceptualization of Indian Nationalism and consciousness in 19th Century India. It deals with the emergence Indian National Congress, along with swadeshi movement and revolutionary nationalism. The revolt of 1857 inflamed the Home Rule Movement and the Gandhian led movements in the 20th century. To analyses the rise of peasant and tribal movements, the emergence of Indian capitalist class and the communal groups like Muslim League and Hindu Mahasabha. It also deals with the two-nation theory of partition and Independence of India. The different approaches of economic history, Indian agricultural policies and British land revenue system towards Indian subcontinent. The desensitization, deindustrialization, rise of working-class movement, transportation facilities and commercialization of agriculture are the consequence of British economic policies. The debate of drain of wealth, free trade**

	and development of Banking system are also a part of the paper. Outcome: The paper's outcome is to make students aware about the concept of nationalism and consciousness of 19th Century India under British Imperialism. It highlights the contribution of INC and other revolutionary organizations to propagate the notion of nationalism. It enlightens the students about the capitalist class and communal group's contribution towards the theory of partition and independence of India.elucidates different approaches the economic history of British India in 18th Century to 19th Century. The theory of depeasantization, deindustrialization, working class movements are studies in the paper. It also educated the modern form of financing system, free trade and drainage of wealth from the colonies to colonialist states.
HCMT- 302: CORE HISTORY AND CULTURE OF MODERN TELANGANA (FROM 1948 to 2014.A.D.)	**History of Modern Telangana explores the past of India's youngest state. It traces Telangana's history from the establishment of the Asaf Jahi reign in the eighteenth century till the formation of the state of Telangana in June 2014, and deals primarily with the socio-economic and political developments that took place in the region during this period. The region called Telangana has, for centuries, had a distinct culture and a history of its own. Moving away from the dynastic perspective usually used in conventional history writing on the erstwhile Hyderabad State, this volume studies the social and economic conditions that led to this distinct identity. It also explores the unique political and administrative structures of the Nizam's era and the changes brought about through British influence during the colonial period. These political processes and structures were further shaped by the various people's movements that occurred in the region in the first half of the twentieth century. These movements, coupled with the political developments taking place in the rest of India, resulted in the end of the Asaf Jahi rule and the merger of the region with the newly-independent Indian union in 1948. This volume studies the rich history of this region in the context of events that were simultaneously transpiring in the rest of India. In doing so, it offers a critical, comprehensive understanding of the modern history of Telangana.**
BC-303: CORE BUSINESS COMMUNICATION	**Students can get the knowledge ofCommunication, business communication, historical background, lifeblood of an organization, types of business communication, internal communication, external communication Oral, written, and visual communication. Communication theories. Effective business writing skills. Effective**

	business communication tools.
HTM-304: ELECTIVE- I (A) **HISTORY OF SCIENCE AND TECHNOLOGY IN MODERN INDIA (1857-1947.A.D.)**	**The paper is basically deals with the development of science and technology throughout the historical era. It discusses the sources and development of astronomy, agricultural, textile and 6 mining technology. It also briefs the response of Indians towards scientific knowledge. It also shows the pioneer and contribution of Indian scientists. Adding to that the paper shows the postcolonial evolution of nuclear energy and defense researches in India. Learning Outcome: The paper analyses the technological innovations in India throughout the ear. It enhances the mental sphere of the students by educating them on the technology on astronomy, agricultural, textile and mining. It educates the students about the Indians response towards scientific knowledge, postcolonial evolution of nuclear energy**
HCK- 304: ELECTIVE- II (B) **HISTORY AND CULTURE OF THE KAKATIYAS**	**The paper analyses the Kakatiya Kingdom and Kakatiya Rulers in the history of India. The Kakatiya rulers had ruled for 300 years from Warangal by culturally and politically uniting the Telugu speaking people. The Telangana government in its efforts to give importance to the history of Kakatiya rulers had decided to bring the heir of the Kakatiya dynasty to Telangana. According to the officials, although the forts, temples and monuments of the Kakatiya dynasty were ravaged by the Delhi Sultans during their invasions and it has been hundreds of years with many natural disasters, they still stand with pride. After the death of Prataparudra in 1323, the Kakatiyas' administrative skills took a new turn. Prataparudra's brother Annamadevu established the Mali Kakatiya Empire covering an area of 13,000 sq km as the center of Dantewada. The Kakatiya descendants, beginning with Prataparudra's brother Annamadevu, still survive. The way in which millions of tribals treat Maharaja Kamal Chandra Bhanj Dev Kakatiya as their current successor, as their god is astounding.**
HCI-305: ELECTIVE -III (C) **HISTORY OF CONTEMPORARY**	**Unearth the true nature of the British rule and its disastrous impact on Indian economy and society. To Gauge the disillusionment of people against the Company's rule even during the early 19th century. To Assess the causes and effects of Reformation movements**

INDIA(1947-2000.A.D.)	**and also inspire the public to overthrow inequalities of the present-day society. To Rise above petty parochial issues after understanding the sacrificial saga of freedom struggle. To Evaluate the undercurrent of communal politics that led to India's partition and identify the enemies of India's integrity and sovereignty. To Visualize where places are in relation to one another through map pointing. Students will be able to categorize different school of thoughts about Modern India history. 4. Students will be able to analyse social background of Indian Nationalism 5. Students will be able to illustrate rise and growth of Economic Nationalism in India.**
HS- 305: CORE (A) HOSPITALITY MANAGEMENT	**Knowledge of the causes of development induced displacement. Understanding of the process of land acquisition in India. Knowledge of the impact of development on displaced people. Understanding of people's resistance to development induced displacement. Knowledge of a just displacement and rehabilitation policy. To understand the dominant concept of development, that is, economic development. To develop insights about the social cost of development. To understand the features of a resettlement and rehabilitation policy based on principles of human rights and social justice.**
ES- 305: CORE (B) ENTREPREURSHIP	**To analyse the demonstrate an ability to engage in critical thinking by analyzing situations and constructing and selecting viable solutions to solve problems. Graduates will demonstrate an ability to work effectively with others. Our Entrepreneurship and Innovation programme combines theoretical and empirical perspectives with the development of practical skills and opportunities for the application of knowledge to real-life organisational issues faced by those establishing and managing innovation-driven organisations. Key concepts underpinning entrepreneurship and its application in the recognition and exploitation of product/ service/ process opportunities. Key concepts underpinning innovation and the issues associated with developing and sustaining innovation within organisations. How to design creative strategies for pursuing, exploiting and further developing new opportunities. Issues associated with securing and managing financial resources in new and established organisations**
EET- 305: CORE (C) ECOLOGY, ENVIRONMENT AND TOURISM	**Tourism has become one of the largest industries in the world in terms of employment and international trade. On the other hand, public concerns have been growing for the environmental, ecological, and social impacts of tourism, such as the overuse of natural**

	resources, carbon emissions, neoliberalism-driven tourism industry. This course investigates the relationship between tourism and natural environments. The course considers the recreational, educational, and economic aspects of tourism associated with protected areas, agricultural landscapes, green open spaces, and cultural assets. The course first discusses environmental attitudes and preferences in the use of the natural and cultural resources, and then choice of travel modes. The course next introduces a broad range of sustainable tourism models, including agro-tourism, sports (e.g cycling, bush-walking) tourism, and culture tourism. The course also brings attention to pro-poor tourism, which is an important instrument to help the poor in developing countries to combat poverty, as well as community-based ecotourism, which can consolidate indigenous knowledge, engage local communities, and triggers local economic development.
SEMESTER – IV	
HHM - 401: CORE HISTORIOGRAPHY AND HISTORICAL METHOD	**The paper deals with the meaning, scope and importance of historical methods and the traditional history writings i.e., Greeco Roman Traditions, Medieval understanding, scientific history, total history. It also analyses the historicity of source materials and its use. The section also deals with the preliminary ideas in the proposed area of research, explanation and presentation in history and the challenges to History writing. Learning Outcomes: The paper examines the methodological understanding of history in a specific manner. It acquits the students on different traditional historical writings and scientific history writings. It exposes the ideas of research area, representation in history and the challenges of writing in history. Carry out independent research pertaining to any specific issue. Design research, justifying use of various methods/tools to carry out the same. Collect, analyse and interpret both quantitative and qualitative data. Develop a definitional and operational understanding of the scientific method.**
TPMCI- 402: CORE TRIBAL AND PEASANT MOVEMENTS IN COLONIAL INDIA(1800-1950.A.D.)	**Indian peasants have a long tradition of armed uprisings, reaching back at least to the initial Bri- tish conquest and the last decades of Moghuil governnent. For more than 200 years peasants in all the major regions have risen repeatedly against landlords, revenue agents and other bureaucrats, money- lenders, police and military forces. During this period there have been at least 77 revolts, the smallest of which probably engaged several thousand peasants in active support or in combat. About 30 of these revolts must have**

	affected tens of thousands of peasants, and about 12, several huindreds of thousands. The uprisings were responses to deprivation of unusually severe character, always economic, and often also involving physical brutality or ethnic persecution. The political independence of India has not brought surcease from these distresses. Major up- risings under communist leadership since British rutle not unnaturally show a continuity of tactics with earlier peasant revolts. Of these, the more successful have involved mzass insurrections, initially against specific grievances, and the less successful, social banditry and terrorist vengeance. Both in the case of communist revolts and in that of earlier peasant uprisings, social banditry and terrorist vengeance, when they occurred, appear to have happened in the wake of repression of other forms of revolt
CT- 403: CORE CONTEMPORARY ISSUES IN TOURISM	**There has been considerable growth in interest in the field of travel medicine and the intersection with Tourism Studies since the 1990s. Yet this interest from a medical perspective is not new as a review of The Lancet, one of the most well-established medical journals, shows. What is new is the way in which the interest in travel medicine has developed across the science–social science divide and has now become one strand of a wider practitioner and academic interest in tourist well-being. With the exception of studies on technology and tourism and environmental science and tourism (e.g. climate change), this science–social science intersection has been comparatively absent from research in Tourism Studies. For this reason, this current issue's paper seeks to broadly outline the evolution of this area of study and some of the influential studies published to date along with some of the research agendas now emerging in this new area of study.**
AAT- 404: ELECTIVE I (A) ART AND ARCHITECTURE OF TELANGANA	**Telangana, due to its geographical location, is the realm where two diverse cultures from the north and the south of the country merge and create a composite culture region with diverse cultural, social and economic backgrounds. Thus, Telangana links the north and south of India. Hyderabad, the state capital, is a classic example of Telangana heritage, exemplified by a number of archeological monuments such as the Charminar, the Golkonda Fort, Mecca Masjid, the Sri Chennakesava Swamy Temple, UjjainiMahankaali Temple and Hussain Sagar, to quote a few. Other important heritage sites in Telangana, apart from Hyderabad, are Adilabad, Karimnager, Khammam, Mahabubnagar, Medak, Nalgonda, Nizamabad and Warangal. Each of these has several heritage**

	monuments that emerged during the state's long history.Culture in Telangana is a combination of customs adopted from Persian traditions during the rule of Moghuls and Nizams and more dominantly South Indian customs. Thus ,it has a very rich culture with Telugu culture amalgamated within the fabric of the society. Telangana is potential lies in its culture that blends cultural customs from Persian traditions embedded during Moghuls, QutubShahis and Nizams rule with influential and mainly South Indian customs and traditions. The State has a rich tradition in classical music. It has a rich painting and folk arts such as Burrakatha, shadow puppet show, and Perini Shiva Tandavam, Gusadi Dance, Kolatam, Bonalu, Kite Festival, etc. This paper examine the an overview of art and culture in Telangana State.
DMCI- 404: ELECTIVE-II - (B) **DALIT MOVEMENTS IN COLONIAL INDIA (1800-1950.A.D.)**	**This course deals with the issues of caste, with a specific focus on Dalits in modern India. While offering critiques of the caste system from a Dalit perspective, it also emphasises the coming of age of Dalit voices in India. It looks at the flourishing of Dalit cultures and histories in counter-public spheres.**
WMI-405: ELECTIVE III (C) **WOMEN MOVEMENTS IN MODERN INDIA (1800-1950.A.D.)**	**Women's history seeks to foreground the role they have played in almost every walk of life locating women in their rightful place alongside men. The work of exceptional women has forced traditional history to extend itself and accommodate some women. But the cultural biases, the political commitments, and the disciplinary strategies that excluded women in the first place have remained, by and large unquestionable and are consequently intact though invisible. Though women like men have been equally contributed as agents in History their experiences and actions are not recorded. In the early nineteenth century, the customs existed in the society such as sati, child marriage, devadasi system and polygamy suppressed women. Widows were prevented from re-marriage. There were a large number of widows during the colonial period, especially among the upper castes. From the ancient period onwards, the system of polygamy was quite popular in India. The system showed the degraded status of Indian women in the society. They were treated as mere chattels and their main function was to obey their husbands, to bear children, bring them up and to do household chores.**

TD- 405: ELECTIVE II (A) TOURISM DEVELOPMENT	**Think critically, follow innovations and developments in science and technology. Demonstrate, solve and an understanding of major concepts in all disciplines of science and technology. Tourism development is the process of establishing and maintaining a tourism industry in a particular location. At its most fundamental level, tourism development can be defined as the process of developing strategies and plans to increase/develop/encourage tourism in a particular destination.To acquaint students with different destination. To enable students to plan and develop destination. To learn about the concept of destination**
OB- 405: ELECTIVE II (B) ORGANISATIONAL BEHAVIOR	**Organizational behavior is a discipline that examines the emotions, thoughts, attitudes and behaviors of the employees in a scientific and systematic manner. In other words, organizational behavior examines individuals within the organization in detail. At this point, it can be said that examining the behaviors of employees in the organization provides an important perspective to both the researchers and practitioners. The organizations in which the said behaviors are examined can be non-profit structures as well as non-profit structures. This book examines the issues of organizational behavior in the tourism industry, which has become one of the most important industries in the world. Despite the technological developments, businesses in the tourism industry continue to be laborintensive. The fact that the employees in these businesses are in close contact with the customers makes the organizational processes experienced in these businesses more important than the other businesses. Therefore, it is possible to say that it is important to understand the challenges of organizational behavior in the context of tourism industry. These challenges can be positive or negative organizational behavior issues. Because a positive organizational behavior cannot be managed well, it may bring various problems in organizations. In this book, organizational behavior issues, which are closely related to the businesses in tourism industry, are discussed in detail. In the book, where organizational behavior issues in the tourism industry are examined in a systematic and holistic way, besides empirical studies, which focus on the theoretical framework are also included. Thus, both the conceptual frameworks related to the subjects were tried to be determined clearly and the relationships and effects between the concepts were measured with empirical studies. For this reason, it is expected that the book may be an**

HRMT- 405: ELECTIVE II (C) **HUMAN RESOURCE MANAGEMENT IN TOURISM**	**educational material for associate, undergraduate and graduate students as well as one of the main sources that researchers in the field of organizational behavior will use in their studies. It is also relevant to the tourism industry practitioners, including managers who work for tourism hotels, travel businesses, transportation businesses, among others. (PsycInfo Database Record (c) 2022 APA, all rights reserved)** **Tourism industry is the largest service industry and largest employment generator in the world. As we all know, tourism is a service based industry where in the product is intangible in nature. One of the major factors that determine the success of a travel business is the Human resource department. So in order to compete and satisfy the end user, it is important to have a well trained Human Resource which can deliver the product with utmost satisfaction. From Hotel Industry to Travel Agencies, every subsidiary of the Tourism Industry is dependent on Person to Person contact. It is because of this, very attribute of Heterogeneity and intangibility the role of Human Resource Management and its importance increases manifold. From recruiting to selecting and then training the Human Resource to make them efficient enough to interact with the Tourists and satisfy their needs of Recreation, pleasure, pilgrim etc by providing high standard services which are human contact based and have very less mechanistic substitutes.**

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DEPARTMENT OF TELUGU
PROGRAMME NAME: M.A. TELUGU
PROGRAMME CODE: 014

PROGRAMME OUTCOMES

PO1: Critical Thinking: The students will be able to differentiate in between good and bad and will be able to take informed decisions.

PO2: Effective Communication: The Students will definitely have improved language skill, both reading & writing, and hence will be able to effectively communicate.

PO3: Social Interaction: This Programme requires the students to interact with others during their Course work and hence will contribute to social interaction

PO4: Effective Citizenship: The students will develop the knowledge with regard to the rich culture and heritage of India and hence will develop a sense of respect.

PO5: Ethics: The Programme is loaded with epics like Ramayana, Mahabharatha, Satakas, etc., which talk about human values and ethics.

PO6: Environment and Sustainability: The Courses in the Programme address Nature as Goddess or Mother and hence the students who undergo the programme inculcate great respect for the same and hence will work towards the protection.

PO7: Self-directed and Life-long Learning: A student who graduates the Programme will understand that Knowledge is Ocean and learning is unending.

PROGRAMME SPECIFIC OUTCOMES

POI: Inculcates Values and Ethics into students

PO2: The Student will learn Teaching Skills

PO3: The Students develop an understanding with regard to rich Culture and Heritage of India

PO4: The student will get mastery over language and literature

PO5: The Students will improve their knowledge with regard to various Dialects of the Language.

PO6: The Student will also learn about the intricate of Journalism.

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MA TELUGU SEMISTER – 1	OUT COMES
101 Sampradaya Sahityam - Patyamshaalu	This paper is all about Telugu as Classical language and its ethics. Students are taught the impact of values, culture, and religion on life and literature in theancient period by going through ancient Telugu literature
102 Pracheena Sahitya Charitra(upto 16th century)	A History of the Teluguliterature aims to equip students with the skills, insights and appropriate theoretical approaches which are necessary to analyse and describe changes in the structure of the Telugu literature from the earliest written records.
103 Bharateeya Alankara Shastram	Aesthetics of Telegu language and Literature. acquire knowledge on Alankaras (prosody) from the ancient literary texts.It is to analyse the literary texts to know how the ancient poetry has given prominence to Alankaras and how the texts have given significance to prosody
104(A) Bala Vyakaranam	Students acquire knowledge syllable and structures.
104(B) Prouda Vyakaram	Telugu grammar skills
105(A) Telangana Charitra – Samkruthi	A History of the Telangana literature and culture
105(B)Telugu Naatakam	Students are made to get acquainted with various aspects of Telugu drama from time to time.

SEMISTAER - 2

201 Sampradaya Sahityam - Paathyamshaalu	This paper is all about Telugu as Classical language and its ethicsin the time of srikrishndevarayalu. Students are taught the impact of values, culture, and religion on life and literature in the ancient period by going through ancient Telugu literature
202 Pracheenna Sahitya Charitra(16-19 century)	Students will have knowledge of srikrishndevarayala and astediggajala's literature impact on literature.
203 Adhunika Sahitya Vimarsha	Criticism and analysis
204(A)Chamdasu – Alankaralu	Structure of Telugu grammar and to know

	to understand the use of Alankaras through comparative study of the poetry.
204(B)Telugu Journalism	Writing skills of articles, analytic skills of society
205(A)Samkruta Sahitya Parichayam	A history of Sanskrit Literature
205(B) Telugu Sahitya Prakriyalu	Different theories of Telegu literature

SEMISTATER - 3

301 Adhunika kavitvam – Pathyamshaalu	To understand the distinction between the classical and modern styles of writing poetry and the efforts to come out from the clutches of meter, rhyme, rhythm etc. to reach out to the common man.
302Bhasha Shastra Parichayam	Introducing Linguistics. Articulation will be improved, vocalics are modified.
303 Janapada Vignanam	Students will assimilate and understand folk literature. Folk Songs, folk tales, riddles, proverbs and folk culture.
304(A) Telugu Parishodana	Introducing Research methodology, hypotheses, rhetoric.
304(B) kathanika – Pathyamshalu	Develops literary composition among students, how it reflects real life in the stories, through which sociological facts can be understood easily.
305(A)Bammera Potana (Prateka Adhyayanam)	special study on Pothana. Epics and religious studies. Value and ethical education through Pothana Bhagavatam.
305(B)Vachana Sahityam	Evolution of modern literature and introducing prose studies.

SEMISTATER - 4

401 Adhunika Kavitva Vikasam	Emerging of Modern Poetry, Evolution, Place of Literature - during independence, after independence.
402 Telugu Bhasha Parinamam	To be able to understand the distinction between the ancient and modern grammar and the value given to stylistics, meter, rhythm, and musical quality. And also, to master the basic rules of grammar of the

	classics and locate the same in the poetry selections
403 Girijana Vignanam	Introducing all Indian Tribal culture and tradition
404(A) Telangana Sahitya Vaitatalikulu	Bards of Avon in Telangana literature like Suravaram, Vattikota, Dasaradi, etc.
404(B) Bharateeya Sahitya Vaitalikulu	Bards of Avon in Indian literature like Mulk Raj Anand, Rabindranath Tagore, Sharatbabu, Bankim Chand Chatterjee etc.
405(A) Navala – Pathyamshaalu	Emerging and development of novel characters of Novel influence of foreign literature on Telugu literature – different patterns of modern telugu literature be clarity known
405(B) Project	Literary oriented topic are chosen to project.

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DEPARTMENT OF DEVELOPMENT STUDIES
PROGRAMME NAME: M.A. DEVELOPMENT STUDIES
PROGRAMME CODE: 317

M.A- Development Studies - Programme Outcome (POs)

S. No	Area	Programme Outcome
PO1	**Critical Thinking**	The students of MA Development Studies understand the economic, legal, and social issues that are being faced by the society by using the latest information and try to find solutions to such problems with a critical thinking.
PO2	**Effective Communication**	The Development studies students while understanding various issues in the society, they invariably interact with many stakeholders in the society through their effective communication and it will further enhance their communication effectiveness.
PO3	**Social Interaction**	The Development study students have to complete a project report as part of their course, for which they have to interact with many people for their required information. So, this will further improve the social interaction.
PO4	**Effective Citizenship**	The Development study students will learn various developmental issues that are happening for the betterment of the society which will enable the students to become effective citizen in the society.
PO5	**Ethics**	Students will learn basis of the society formation and its development. Ethics are important for society peaceful living and further progressing. Therefore, ethics are imbibed by the Development study students and strive for furtherance of it.
PO6	**Environment and Sustainability**	The Development Studiesstudents understand the environmental issues in the process of development and demonstrate the same knowledge for the need of sustainable development and contribute to the development of society.
PO7	**Self-directed and life-long learning**	The subject of Development Studies is dynamic in nature and hence one has to continuously learn the changes taking place in the society development.

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Programme Specific Outcomes (PSOs)

S. No	Area	Programme Specific Outcomes
PSO1	**Knowledge**	Understand the dynamics of social, political and economical issues in the society development.
PSO2	**Analysis**	Analyses various issues that are affecting the society development by using appropriate methods.
PSO3	**Application**	The analyses results of society development are applied for further better development of the society.
PSO4	**Decision**	The development studies student what kind of society he/she is looking for and take a decision to build such kind of society in near future.

M.A - Development studies - COURSE OUTCOMES	
SEMESTER – I	
DS 101: CORE-I ECONOMICS FOR DEVELOPMENT STUDIES	**To develop the understanding on basic concepts of Economics to the students of development studies for analysing developmental issues.**
DS 102: CORE - II BASIC QUANTITATIVE METHODS FOR DEVELOPMENT STUDIES	**For analysing developmental issues students should have an understanding of quantitative methods and its applications in the social sciences.**
DS 3 - CORE - III FUNDAMENTALS OF HISTORICAL DEVELOPMENT	**To provide students with a solid foundation of fundamentals of historical developments required to solve socioeconomic problems and also to pursue higher studies.**
DS 4 CORE-IV FUNDAMENTALS OF SOCIETY AND SOCIAL CHANGE	**To generate sensitivity towards problems facing by the Society and Social Change, ethics and human values.** **To develop orientation towards effective communication and critical analysis.** **To appreciate the interrelationships among disciplines as they relate to everyday life.**

DS5: CORE-V FUNDAMENTAL ECONOMIC GEOGRAPHY	**To develop the understanding on the nature and basic concepts of Economic Geography.** **New Economic Geographies, Ecologies and Business Innovation studies and their consequences for places and communities.** **Apply knowledge of Economic Geography to the everyday life.**
SEMESTER – II	
DS 201: CORE PUBLIC POLICY AND DEVELOPMENT	**To develop an understanding on the basics of public economics, public policy and its development to the students.** **An Understand of the various constituencies that influence how policy is made and the theoretical underpinnings of the real life policy choices.**
DS 202: CORE ADVANCE QUANTITATIVE METHODS FOR DEVELOPMENT STUDIES	**This course is intended as an advance consideration of Quantitative methods for analysing developmental issues, students should have an understanding of quantitative methods and its applications in the social sciences.** **Develop an understanding of how to conduct an appropriate statistical analysis of the data and interpret the results.**
DS 203: CORE THEORIES OF DEVELOPMENT	**An understanding of development theory is essential for development studies student.** **To develop an understanding about various development theories those are determining development of a society or nation.**
DS 204: CORE DEVELOPMENT EXPEIANCE OF INDIAN ECONOMY	**To develop basic understanding on characteristics of Indian economy.** **Factors that are determining economic development of the country and identify the potential for economic development of nation and work on it.**
DS 205: CORE SOCIAL SCIENCE RESEARCH METHODS	**To develop an understanding on various social sciences research methods and its limitations of particular research methods.** **To develop skills in qualitative and quantitative data analysis and presentation.** **To develop advanced critical thinking skills and writing skills.**
SEMESTER – III	
DS 301: CORE PLANNING AND DEVELOPMENT	**Students will acquire basic knowledge of planning and practices of planning, including Indian plantings for development of various sectors.** **Understand the importance of planning undertaken by the government of India and their objectives, failures and achievements.**
DS 302: CORE EDUCATION AND DEVELOPMENT	**Understand the education contribution to economic development.** **Identify factors responsible for development of education in India.** **Suggest measure needed for development of education in India.**

DS 303: CORE SOCIAL MOVEMENT AND DEVELOPMENT	**Students acquire the knowledge of social movement that effected the development. Analyse social behaviour that determine the society development. Student will develop the analytical skills in policy analysis and implementation process.**
DS 304: ELECTIVE I (A) RURAL DEVELOPMENT AND ISSUES	**The subject of rural development is extremely important for students to understand rural dynamics. To impart knowledge of agriculture and allied sectors importance for rural development. To develop the awareness on utilisation of modern agricultural technology through various extension activities.**
DS 304: ELECTIVE I (B) DEVELOPMENT AND ENVIRONMENT	**To develop the understanding on key concepts of economic, political, and social factors determine the development and environment. Improves the understanding on concepts and methodology of evaluation of ecological and developmental issues and their application in environmental problem solving. Demonstrate an integrative approach to environmental issues with a focus on sustainability development goals.**
DS 305: ELECTIVE II (A) DEMOCRACY AND DEVELOPMENT	**The course provides a detailed understanding of the concept of Political Theory. It also provides a detailed treatment of the various basic concepts of Political Theory like; Democracy, Liberty, Equality, Justice. To explain the institutional functioning within a constitutional framework of democracy**
DS 305: ELECTIVE II (B) DEVELOPMENT AND DIPLACEMENT	**Knowledge of development and displacement is essential for administrators and rulers. Understanding of the process of land acquisition and its impact on displacement of people and rehabilitation policy.**
SEMESTER – IV	
DS 401: CORE INFRASTRUCTURE AND DEVELOPMENT	**To develop the understanding of relation between the infrastructure and development. To Identify the inadequacies in infrastructure of different sectors and the policy changes required for infrastructure development. Discuss the role of public and private participation in financing of infrastructure.**
DS 402: CORE HEALTH AND DEVELOPMENT	**Understand the Health contribution to economic development. Identify factors responsible for development of Health in India. Suggest measure needed for development of Health in India.**
DS 403: CORE PROJECT WORK	**To motivate the students to Carry out independent research work on any specific developmental problem.**

	To develop the ability to design a research proposal and complete it. **To develop the information collection, compilation and analysis of it.** **To develop report writing skills**
DS 404: ELECTIVE I (A) URBAN DEVELOPMENT AND ISSUES	**The subject of Urban development is extremely important for students to understand urban dynamics.** **To impart knowledge of urban agglomeration and its effects on development of economy.** **To develop the awareness on migration of population to urban areas and consequences of it.**
DS 404: ELECTIVE I (B) DEVELOPMENT AND CRIME	**Students will understand the relation between development and crime.** **To develop the understanding of factors responsible for increase of crime with the development of economy.** **Students will also indentify how to curb the crime for further development of the society.**
DS 405: ELECTIVE II(A) DISASTER MANAGEMENT	**To develop the understanding on different disasters and its consequences.** **Identify the Technological innovations in Disaster Risk Reduction.** **To develop the practice of participation in disaster management activites.**
DS 405: ELECTIVE II(B) PERSPECTIVE IN SCIENCE, TECHNOLOGY AND DEVELOPMENT	**Students will understand the relation between science, technology and development.** **Identify the technologies needed for the development of economy and society.** **Able to use the science and technology for the development of individual, society and economy.**

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DEPARTMENT OF COMMERCE
PROGRAMME NAME: M.Com.
PROGRAMME CODE: 408

M.COM. - PROGRAMME OUTCOMES	
PO1: CRITICAL THINKING	The Programme aims at inculcating Critical Thinking into the student. After the pursuing the Programme the student shall take informed actions after making Cost-Benefit Analysis at the personal, group and organisational levels.
PO2: EFFECTIVE COMMUNICATION	The un-orderly thoughts to be put in order, appropriately worded, checked for the intended meaning, medium of communication to be selected, message to be sent and feedback to be taken from the receiver. In the Businesses effective communication is quintessential as it is a group of people working together for a common objective.
PO3: SOCIAL INTERACTION	The student will be able understand the others point of view through observation, interaction, discussion, debate, agreement, disagreement and then come to a conclusion
PO4: EFFECTIVE CITIZENSHIP	Embraces core democratic values and strives to live by them. Accepts responsibility for the well-being of oneself, one's family, and the community. Has knowledge of the people, history, and traditions that have shaped our local communities, our nation, and the world.
PO5: ETHICS	Human values convey personal conviction, ethics describe the accepted principles and standards of conduct about moral duties and virtues as applied to an organization. Codes of professional ethics guide the stakeholders of an organization about the desirable and undesirable acts related to the profession
PO6: ENVIRONMENT AND SUSTAINABILITY	The student understands & appreciates that Development which can meet the need of the present generation without compromising the ability of the future generation to meet their own needs is necessary
PO7: SELF-DIRECTED AND LIFE-LONG LEARNING	Knowledge is an ocean and learning is life long. The student shall become independent and self-directed and shall aspire for the knowledge & wisdom.

M.COM. - PROGRAMME SPECIFIC OUTCOMES	
PSO1	Understand the basic concepts of the Managerial Economics, Accounting, Finance, Marketing, Human Resources, Banking, Insurance and such areas that facilitate Business.
PSO2	To get acquainted with the subject knowledge of Accounting, Finance, Marketing, Banking, International Business and etc.
PSO3	Application of the concepts learnt to the practical situation
PSO4	Implement the acquired knowledge for the long term sustainance, profitability, cost-benefit analysis, problem solving and etc. of the Business.

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M.COM. - COURSE OUTCOMES	
SEMESTER - I	
COM 1: CORE - I **MANAGERIAL ECONOMICS**	To impart conceptual and practical knowledge of Managerial Economics
COM 2: CORE - II **PRINCIPLES OF MARKETING**	To familiarize the students with basic concepts of Marketing
COM 3 - CORE - III **ORGANISATION THEORY & ORGANISATION BEHAVIOUR**	To familiarize the students with the concepts and dimensions of Organization Theory
COM 4: ELECTIVE - I (F) (A) (T)(IB)(I) (B)(CA) **FINANCIAL MANAGEMENT**	To introduce the subject of Financial Management and to acquaint the student with various techniques of Financial Management
COM 4: ELECTIVE - I (M)(E-COM) **RETAIL MARKETING**	To enable the students to understand the finer nuances of Retail Marketing
COM 5: ELECTIVE - II (F)(A)(T)(IB)(I)(B)(CA) **INDIAN ACCOUNTING STANDARDS**	To familiarize the student with accounting standards and financial reporting practices
COM 5: ELECTIVE - II (M)(E-COM) **ADVERTISING & SALES MANAGEMENT**	To develop an understanding of the decision processes in advertising from a marketer's point of view and to understand the concept, methods and strategies of sales management.

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SEMESTER - II	
COM 6: CORE - I **INTERNATIONAL BUSINESS AND BUSINESS ENVIRONMENT**	To familiarize and acquaint the students with the knowledge of business environment and latest development in business environment
COM 7: CORE - II **MARKETING MANAGEMENT**	To understand the components of Marketing mix in detail
COM 8: CORE - III **HUMAN RESOURCE MANAGEMENT**	To understand various facets of Human Resource Management & comprehend emerging development in HRM.
COM 9: ELECTIVE - I (F) (A)(T) (IB)(I)(B) **INVESTMENT MANAGEMENT**	To familiarize the student with the principles and practice of Investment Management and acquaint the students with the functioning of the Indian Capital Market.
COM 9: ELECTIVE - I (M)(E-COM) **CONSUMER RIGHTS & EDUCATION**	To develop the awareness of consumer rights and need role and importance of consumer education, to understand finer nuances of Consumer Protection Act in India in the arena of Marketing.
COM 9: ELECTIVE - I (CA) **DATA COMMUNICATIONS AND NETWORKS**	To familiarize the students with fundamentals of data communication, computer networks, network applications and services
COM 10: ELECTIVE II (F) (A)(T) (IB)(I)(B) **ADVANCED MANAGERIAL**	To familiarize and acquaint the student with application of advanced managerial accounting techniques.

ACCOUNTING	
COM 10: ELECTIVE - II (M)(E-COM) **MARKETING RESEARCH**	To develop the skills of marketing research, to understand the importance and role of research in the total marketing concept and to have an understanding about the conceptual issues in applications of marketing research.
COM 10: ELECTIVE - II (CA) **OBJECT ORIENTED PROGRAMMING WITH C++**	Emphasizes a strategic problem solving approach to programming. The fundamental constructs of the paradigm - identification, creation and use of high level classes are explained. Algorithmic constructs are introduced as means to support class implementation.
SEMESTER - III	
COM 11: CORE - I **RESEARCH METHODOLOGY & STATISTICAL ANALYSIS**	To develop research orientation among the students and develop analytical skills.
COM 12: CORE - II **E-COMMERCE**	To know and learn about information technology through its applications and to give an overview of E-Commerce fundamentals with an objective of exposing them to the functional areas of Ecommerce.
COM 13: CORE - III **COST ACCOUNTING AND CONTROL**	To impart conceptual knowledge of cost accounting and to equip with skills of ascertainment and control of costs.
COM 14: ELECTIVE - I (F) (IB) **INTERNATIONAL FINANCIAL**	To gain the conceptual knowledge and application of International Financial Management

MANAGEMENT	
COM 15: ELECTIVE - I (A) ADVANCED CORPORATE ACCOUNTING	To understand the application of advanced corporate accounting practices in the fields of modern business and profession.
COM 14: ELECTIVE - I (M) SERVICES MARKETING	To develop the skills of marketing services, to understand the importance and role of services in the total marketing concept.
COM 14: ELECTIVE - I (T) DIRECT TAXATION	To acquaint the students with the theoretical and practical aspects of direct taxes including wealth taxes and to make them use computer packages for tax calculations.
COM 14: ELECTIVE - I (I) PRINCIPLES AND PRACTICE OF LIFE INSURANCE	To acquaint the student about the changing scenario in Life & Health Insurance.
COM 14: ELECTIVE - I (B) E-BANKING AND FINANCIAL SERVICES	To acquaint the student with Innovative Banking and Financial Services offered to meet the varied requirement of both the corporate and individual customers
COM 14: ELECTIVE - I (E-COM) NETWQUETTES AND CYBER SECURITY	To equip the students with knowledge of accessibility and its security features.
COM 14: ELECTIVE - I (CA) RELATIONAL DATA BASE MANAGEMENT	To learn about different data storage, organization, design techniques and implementation techniques

COM 15: ELECTIVE - II (F) SECURITY ANALYSIS & PORTFOLIO MANAGEMENT	To familiarize with analysis of securities market, valuation of different securities for the purpose of building optimal portfolio and the students with latest concepts and trends in the securities market.
COM 15: ELECTIVE - II (A) FINANCIAL STATEMENT ANALYSIS	To familiarize and acquaint the student with application of analysis of financial statements techniques.
COM 15: ELECTIVE - II (M) CONSUMER BEHAVIOUR	To develop the skills of marketing by understanding the finer aspects of consumer behaviour, to understand the importance and role of consumer behaviour in the total marketing system.
COM 15: ELECTIVE - II (T) INDIRECT TAXATION	To acquaint the students with the basics and latest developments in the areas of Indirect taxes.
COM 15: ELECTIVE - II (IB) INTERNATIONAL TRADE THEORY AND PRACTICE	To Provide the knowledge of international business and acquaint students with latest development in international business.
COM 15: ELECTIVE - II (I) PRINCIPLES AND PRACTICE OF GENERAL INSURANCE	To acquaint the student with the techniques of General Insurance
COM 15: ELECTIVE - II (B) BANKING TECHNOLOGY	To make students conversant with banking technology in terms of delivery, security and controls with reference to India.
COM 15: ELECTIVE - II (E-COM) NETWORK INFRASTRUCTURE AND PAYMENT SYSTEM	Make the student to understand the fundamentals of network infrastructure & its usage in E-payments

COM 15 ELECTIVE - II (CA) **CYBER LAWS**	The student will be able to know the information Technology Act 2000, cyber laws, cyber crime, tools and methods used in cyber crime and cyber security.
COM ID PAPER - I **CONSUMER AFFAIRS**	To familiarize the students with their rights and responsibilities as a Consumer, the social framework of Consumer Rights and legal framework of protecting consumer rights.
SEMESTER - IV	
COM 16: CORE - I **QUANTITATIVE TECHNIQUES FOR BUSINESS DECISIONS**	To impart inferential skills to the student by using Quantitative Techniques for Business Decisions.
COM 17: CORE - II **CORPORATE TAXATION AND PLANNING**	To acquaint the student with the Theoretical and Practical aspects of Assessing Partnership Firms, Companies, Cooperatives and Trusts.
COM 18: CORE - III **STRATEGIC MANAGEMENT**	To familiarize the student with various strategies for managing businesses
COM 19: ELECTIVE - I (F) **FINANCIAL SERVICES**	To acquaint the student with Innovative Financial Services offered to meet the varied requirement of both the corporate and individual customer.
COM 19: ELECTIVE - I (A) **ADVANCED COST ACCOUNTING & CONTROL**	To provide the skills and application of advanced cost accounting techniques for cost control and cost reduction.
COM 19: ELECTIVE - I (M) **SUPPLY CHAIN MANAGEMENT & CUSTOMER**	To learn Integrated planning coordination and control of all logistical business processes and to learn a few basic aspects of CRM

RELATIONSHIP MANAGEMENT	
COM 19: ELECTIVE - I (T) BUSINESS TAXATION	To acquaint the student with theoretical and practical knowledge of Business Taxation
COM 19: ELECTIVE - I (IB) INTERNATIONAL BUSINESS ENVIRONMENT	To provide the knowledge of international business environment and strategic management of international business environment.
COM 19: ELECTIVE - I (I) ACTURIAL SCIENCE	To introduce the students to the nuances of Acturial Sciences
COM 19: ELECTIVE - I (B) INTERNATIONAL BANKING	Enable the students familiarizing with functions and performance of international financial institutions and operational mechanism of foreign exchange market in India.
COM 19: ELECTIVE - I (E-COM) BUSINESS MODELS FOR E-COMMERCE	To enable the students to learn different elements and models for E-Commerce
COM 19: ELECTIVE - I (CA) ADVANCED EXCEL	To impart the knowledge of excel in data presentation and financial and statistical anlysis.
COM 20: ELECTIVE - I (F) FINANCIAL DERIVATIVES	To make student efficient in the area of derivatives, giving them the knowledge of basics in Derivatives. Future Markets, Options and Swaps, etc.

COM 20: ELECTIVE - I (A) MERGERS AND ACQUISITIONS	To gain the knowledge on M&As which are essentiality mean to attain greater market share; acquire additional brands; cannibalize competing brands; realize improved infrastructure; create new synergies; capitalize on efficiencies and economies of scale or to globalize in the shortest span of time.
COM 20: ELECTIVE - I (M) INTERNATIONAL MARKETING	To understand the components of International Marketing mix in detail
COM 20: ELECTIVE - I (T) INTERNATIONAL TAXATION	Emphasizes on tax traties and tax laws of various countries and analyses importance of the same.
COM 20: ELECTIVE - I (IB) INTERNATIONAL MARKETING	To educate the students about the nuances of International Marketing
COM 20: ELECTIVE - I (I) RETIREMENT PLANNING	To educate the students about the nuances of Retirement Planning
COM 20: ELECTIVE - I (B) CENTRAL BANKING	To familiarize the students with functions and performance of Central banks in general and central banks in USA, UK, European Union and India in particular.
COM 20: ELECTIVE - I (E-COM) LEGAL SECURITY IN E-COMMERCE	To familiarize the students with e-security and cyber laws.

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COM 20: ELECTIVE - I (CA) **WEB DESIGNING**	The Course emphasizes on the skills of designing and creation of web pages, scripting & Markup language, client side scripting language, server side scripting and importance of PHP & My SQL.
COM ID PAPER - II **CORPORATE GOVERNANCE**	To give an overview of the Principles of Corporate Governance and to explain its need and significance.

MAHATMA GANDHI UNIVERSITY, NALGONDA
(*Accredited with "B" Grade by NAAC*)

PROGRAMME NAME: Ph.D. COMMERCE
PROGRAMME CODE: 417

Ph.D. Commerce - PROGRAMME OUTCOMES	
PO1: CRITICAL THINKING	The Student shall get trained for imbibing critical thinking - intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action that shall be applied in the field of Commerce.
PO2: EFFECTIVE COMMUNICATION	A Research Scholar should Effectively communicate, should be well versed with the process of exchanging ideas, thoughts, opinions, knowledge, and data so that the message is received and understood with clarity and purpose. When we communicate effectively, both the sender and receiver feel satisfied. While conducting Research in Commerce the Scholar learns the trait
PO3: SOCIAL INTERACTION	A social relation or social interaction is the fundamental unit of analysis within the social sciences, and describes any voluntary or involuntary interpersonal relationship between two or more individuals within and/or between groups. Commerce Domain is part of Social Sciences. The Researcher has to inevitably interact and elicit the views on various issues as a part of the Research.
PO4: EFFECTIVE CITIZENSHIP	A Researcher should be an effective citizen and needs to embrace core democratic values and strives to live by them., should accept responsibility for the well-being of oneself, one's family, and the community, society, nation, should possess the knowledge of the people, history and traditions that have shaped our local communities, our nation, and the world.

PO5: ETHICS	In Research Ethics are very important. The Researcher throughout the process of conduct of the Research has to follow / implement honesty, objectivity, integrity, carefulness, openness, transparency, accountability, respect intellectual property rights, confidentiality, responsible publication, responsible mentoring, have respect for colleagues, social responsibility, non-discrimination, competence, legality, human subjects protection. The Researcher should develop knowlege of mandates / guidelines in vogue from time to time and follow them scrupulously.
PO6: ENVIRONMENT AND SUSTAINABILITY	The Researcher as a part of Social Responsibility has to undertake research only in such areas which enables conservation of natural resources and protection of global ecosystems to support health and wellbeing, now and in the future.
PO7: SELF-DIRECTED AND LIFE-LONG LEARNING	A Researcher shall be a self-directed learner, is a person who takes responsibility for their own education, for their attainment of knowledge, and their development of mastery. They should be capable of determining what they want to learn and what they need to learn .

Ph.D. Commerce. - PROGRAMME SPECIFIC OUTCOMES	
PSO1	Acquire the Mastery in the Domain area - Finance, Accounting, Marketing, Human Resource Management, Banking & Insurance, Business Environment & Policy
PSO2	Application of the Domain Knowledge for solving the real time issues / problems
PSO3	Implement the acquired knowledge for the long term sustainance, profitability, cost-benefit analysis, problem solving and etc.

MAHATMA GANDHI UNIVERSITY, NALGONDA

(*Accredited with "B" Grade by NAAC*)

Ph.D. Commerce - Course Outcomes	
PAPER - I RESEARCH METHODOLOGY	Explains how a researcher should carry out their research. It's a logical, systematic plan to resolve a research problem. A methodology details a researcher's approach to the research to ensure reliable, valid results that address their aims and objectives.
PAPER - II (M) MARKETING MANAGEMENT	Marketing management is the organizational discipline which focuses on the practical application of marketing orientation, techniques and methods inside enterprises and organizations and on the management of a firm's marketing resources and activities. The Researcher should develop thorough understanding in this domain.
PAPER - II (BI) BANKING & INSURANCE	The Banking and the Insurance sectors play a major role in the growth of the economy. Since, the initiation of these two sectors, they have gone through drastic changes catering to the changing demographics and the priorities of the population of the country. The Researcher is expected to gain thorough understanding of the concepts, functioning, changes that are taking place in the Banking & Insurance Sectors.
PAPER - II (A) ACCOUNTING	The knowledge in the Accounting domain is continuously evolving and changing to suit the needs of the dynamic Markets. The Researcher is required to keep abreast with the changes.
PAPER - II (BE) BUSINESS ENVIRONMENT & POLICY	Business Environment is sum or collection of all internal and external factors such as employees, customers needs and expectations, supply and demand, management, clients, suppliers, owners, activities by government, innovation in technology, social trends, market trends, economic changes, etc. For regulating the Business the competent authorities shall frame the Policy, both at national and international levels. The Researcher has to develop a thorough knowledge of the same.
PAPER - II (MGT) ORGANISATION BEHAVIOUR & HUMAN RESOURCE MANAGEMENT	Organizational behavior is the study of human behavior in organizational settings, and the organization itself. Human resources management is the process of hiring and developing employees so that they become more valuable to the organization. The Researcher has to develop thorough understanding in the domain.
PAPER - II (F) FINANCE	Finance, of financing, is the process of raising funds or capital for any kind of expenditure. It is the process of channeling various funds in the form of credit, loans, or invested capital to those economic entities that most need them or can put them to the most productive use. The Researcher has to develop thorough understanding in the domain.

MAHATMA GANDHI UNIVERSITY, NALGONDA
(*Accredited with "B" Grade by NAAC*)

DEPARTMENT OF BUSINESS MANAGEMENT
PROGRAMME NAME: M.B.A.
PROGRAMME CODE: 672

Programme Outcomes – M.B.A.

MBA Travel & Tourism Management course has a well-defined mission to achieve its vision with the distinct and well planned approach to deliver the curriculum in the most efficient and effective manner . The curriculum specified by the Mahatma Gandhi University is effectively imparted to the students with the support of faculty members through well planned semester wise academic calendar given by the University itself. The UCCBM College shows ample care for the teaching and learning schedules and to provide quality education and the same is ensured by preparing well planned academic calendar. To deliver the curriculum in the most advanced and impartial manner, faculties maintain SESSION PLAN, LESSON PLAN and TRAINEE NOTES along with FACULTY REPORT. All faculties impart their subject knowledge through the use of traditional teaching aids like WHITE BOARD and modern teaching methods like multimedia POWERPOINT PRESENTATION, BLOGS and VIDEOS etc. using projectors. Session plan is submitted before the commencement of the semester, to the Principal, . The major portion of the session plan includes No. of Teaching Hours, Topics covered, Week wise chapter along with their sub topics etc. Lesson plan is also submitted every week to the Principal. In the Lesson plan, faculties mention the major objectives of the topic covered along with major terms and questions being discussed in the class. A properly prepared lesson plan makes the teaching more involving and the students tend to learn things in a better way. The FACULTY REPORT is a very important tool to understand how faculties deliver the curriculum and document their work each week. It includes TOPIC/S COVERED, SUB TOPIC, OBJECTIVE, TEACHING AIDS USED, CONTENTS, and REFERENCES with FEEDBACK OF THE STUDENTS. The College offers various SDP classes across semesters for the benefit of students to improve their communication skills, practical knowledge and soft-skill development along with regular academics. To accelerate the learning, Internet facility with Wi-Fi connectivity is made available throughout the MGU campus to support the students in enhancing their knowledge with easy digital access. Faculty and students progression is actively monitored by the Head of Institution (PRINCIPAL) based on the reports and are done regularly.

Programme Specific Outcome – M.B.A.

The UCCBM College has the mechanism for delivery and documentation of the curriculum set by the University to achieve the educational, social and cultural objectives. The process involves a number of specific decisions taken at the Staff Council and Department Committees to determine workload, allocation of work, preparation of Time Table and recruitment. The College identifies extension and tertiary activities that dovetail into teaching material and enrich it further. Every department has the space to intervene to enhance and enrich the learning and learning outcomes – research and knowledge – through the curriculum. Departments organize field trips and visits for hands-on training, organize Seminars, Conferences, Workshops, Symposia, Student Paper Presentations and Projects to supplement and complement the prescribed curriculum in tangential ways. The curriculum is further documented and effectively delivered by e-resources by the faculty. Department organize their academic tasks and activities accordingly. These mechanisms ensure the smooth and effective delivery and documentation of the curriculum. Teachers are encouraged to use teaching aids like power point and multimedia presentation making their classes more interactive and interesting. College invites the resource persons from the industry who conducts workshops on core subjects and career guidance. College conducts the campus recruitment every year by training and placement cell. The college conduct curricular and co-curricular activities which enrich knowledge of students and help them to develop the leadership qualities.

MAHATMA GANDHI UNIVERSITY, NALGONDA

(*Accredited with "B" Grade by NAAC*)

COURSE OUTCOMES – M.B .A				
S. NO	**CODE**	**PAPER**	**PAPER TITLE**	**OBJECTIVE**
	SEMESTER -I			
1	MB 101	I	Management and organisation behaviour	• To familiarize the students with the behavioral patterns of human beings at individual and group levels in the context of an organization, which in turn is influenced by the environment, enveloping it. The course aims to enhance the ability of the students in terms of the knowledge, prediction and control of human behavior in an organization.
2	MB 102	II	Financial Accounting and Analysis	• The objective of this course is to familiarize the students with the mechanics of preparing and Presentation of financial statements of an organization. Students are expected to analyze and interpret financial statements in this course.
3	MB 103	III	Marketing Management	• The objective of this course is to make familiar the students with basic marketing concepts and Planning, analysis and implementation and control of marketing Programmes.
4	MB 104	IV	Elective- 1 1. Business Law & Environment 2. Managerial Economics	1.The objective of this course is to create Legal Awareness and give exposure to various laws and acts which have impact on business and Industry

				2. The course is to familiarize the students with basic concepts and techniques of micro economic analysis and its applications to managerial decision making.
5	MB 105	V	Elective-2 1. IT Applications for Management 2. Managerial Communication	1. The learning outcome is that the students should be able to comprehend the fundamentals of Information Technology and its' application for Management. 2. The objective of the course is to familiarize the students with the process of entrepreneurship and the institutional facilities available to an entrepreneur in India
6	MB 106	VI	Computer Lab Practicals (MS- Excel Lab)	• The objective of this course is to provide basics of I.T and it's applications through MS Word, MS PowerPoint and MS Excel.
	SEMESTER-II			
1	MB 201	I	Human Resource Management	• The objective of this course is to give students basic concepts of Human Resource management, its functions, methods and applications.
2	MB 202	II	Financial management	• The objective of this course is to acquaint the students with the broad framework of financial decision making in a business.
3	MB 203	III	Statistics for Management	• The objective of this course is to make familiar the students with basic concepts statistics and its application in business.

4	MB 204	IV	Elective- III 1. Operations Management 2. Customer Relationship Mangement	1. The objective of this course is to provide the knowledge of production department and its operations in business. 2. The objective of this course is to understand the role, value and prospects of CRM and to provide managerial insights into the process of forming, managing and enhancing customer relationships.
5	MB 205	V	Elevtive- IV 1. Operations Research 2. Financial Institutions & Markets	1. : The objective of this course is to acquaint the student with the applications of Operations Research to business and industry and help them to grasp the significance of analytical techniques in decision making. 2. : To acquaint the students with Financial Markets and its various segments. To give the students an understanding of the operations and developments in financial markets In India.
6	MB 206	VI	statistical tools using Excel- Lab	• Statistical tools using Time series: forecasting Method of least squares, moving average method. Inference and discussion of results.
	SEMESTER-III			
1	MB 301	I	Business Research Methods	• The objective of this course is to give students a complete exposure to all aspects of conducting research, analysing and interpreting the data with tools.
2	MB 302	II	Total Quality Management	• The objective of this

				course is to provide the knowledge of Quality dimensions, tools and techniques relevance in the business.
3	MB 303	III	International Business	• The objective of this course is to provide inputs of global business, managing business internationally.
4	MB 304	IV	DS Elective- I 1. Investment Management (F) 2. Product & Brand Management(M) 3.Compensation Management(HR) 4. Enterprise Resource Planning (Sys)	1.The objective of this course is to enhance the knowledge of types of investments with risk and returns. Various models and techniques for effective investment decisions 2. The objective of the course is to make the learners' adept in concepts of Product, New Product Development and Testing; also it provides an insight into fundamentals of branding. 3. The objective of this course is to impart the knowledge to students in the areas of compensation and employee behavior, compensation system, Compensation Benefits and compensation challenges. 4. The objective of this course is to impart the knowledge to students in the areas of compensation and employee behavior, compensation system, Compensation Benefits and compensation challenges.
5	MB 305	V	DS Elective-II 1. International Finance (F) 2.Promotion and Distribution Management(M) 3. Organization Development(HR) 4.DataBase Systems(SYS) Laboratory	1.The course objective is to understand the international financial system, various theories and models for foreign direct investments. 2. The objective of the course is to make the learners' adept the concepts of Promotion and distribution with various types of media, personal selling and

			4.1 Practicals in Database Environment	promotion. 3. The objective of this course is to impart knowledge about OD interventions for individual, team and organizational development. 4. SQL-SQL commands for data definition & data manipulation, viewsprocedures - indexing, PL/SQL, forms design process, triggers, SQL report writer, SQL menus.
	SEMESTER-IV			
1	MB 401	I	Strategic Management	• The objective of the course is to enable the learners to comprehend with different business strategies and also to enable them with strategic orientation required in conducting the business.
2	MB 402	II	Supply Chain Management	• The objective of the course is to enable the learners to comprehend with basics of supply chain management, logistics, and networks in any business.
3	MB 403	III	Entrepreneurship Development	• The objective of this course is to provide knowledge of becoming entrepreneur through entrepreneurship concept, types, programs and institutions.
4	MB 404	IV	DS Elective- III 1. Financial Risk Management (F) 2. Consumer Behaviour (M) 3Performance Management(HR) 4. E- Commerce (Sys)	1.The objective of this course is to provide knowledge of types of risk, measurement of risk and techniques for investment decision making. 2. The course objective is to Impart the skills in Students for understanding the consumer behavior inbusiness decisions. 3. The objective of this course is to explain the intricacies of

				performance management, various tools and models for HR decisions. 4. The course aims at familiarizing the students with the production process and related issues in industrial Units. It introduces the students to aspects like quality, Inventory, Maintenance, materials management; and method analysis.
5	MB 405	V	DS Elective-IV 1. Financial Services & Systems (F) 2.Services Marketing(M) 3. Labour Laws & Employee Relations (HR) 4.Advance Excel (SYS)+ Lab(SYS)	1.The objective of this course is to provide information about various financial services and systems. 2. : The objective of this course is to give student a complete exposure to all aspects of service, design, standards, delivering and performing service. 3. The objective of this course is to provide information about labour laws, various acts and industrial relations; it's relevance in HR decisions. 4. To impart basic knowledge of the concepts and tools of SYSTEMS as relevant to industrial organisation and to provide an understanding of the role of SYSTEM in the overall strategic setting.
6	MB 406	VI	Project Work	The objective of the course is to familiarize the students with the process of entrepreneurship and the institutional facilities available to an entrepreneur in India.

MAHATMA GANDHI UNIVERSITY, NALGONDA
(*Accredited with "B" Grade by NAAC*)

PROGRAMME NAME: M.B.A. TTM
PROGRAMME CODE: 684

Programme Outcomes - MBA Travel & Tourism Management

MBA Travel & Tourism Management course has a well-defined mission to achieve its vision with the distinct and well planned approach to deliver the curriculum in the most efficient and effective manner . The curriculum specified by the Mahatma Gandhi University is effectively imparted to the students with the support of faculty members through well planned semester wise academic calendar given by the University itself. The UCCBM College shows ample care for the teaching and learning schedules and to provide quality education and the same is ensured by preparing well planned academic calendar. To deliver the curriculum in the most advanced and impartial manner, faculties maintain SESSION PLAN, LESSON PLAN and TRAINEE NOTES along with FACULTY REPORT. All faculties impart their subject knowledge through the use of traditional teaching aids like WHITE BOARD and modern teaching methods like multimedia POWERPOINT PRESENTATION, BLOGS and VIDEOS etc. using projectors. Session plan is submitted before the commencement of the semester, to the Principal, . The major portion of the session plan includes No. of Teaching Hours, Topics covered, Week wise chapter along with their sub topics etc. Lesson plan is also submitted every week to the Principal. In the Lesson plan, faculties mention the major objectives of the topic covered along with major terms and questions being discussed in the class. A properly prepared lesson plan makes the teaching more involving and the students tend to learn things in a better way. The FACULTY REPORT is a very important tool to understand how faculties deliver the curriculum and document their work each week. It includes TOPIC/S COVERED, SUB TOPIC, OBJECTIVE, TEACHING AIDS USED, CONTENTS, and REFERENCES with FEEDBACK OF THE STUDENTS. The College offers various SDP classes across semesters for the benefit of students to improve their communication skills, practical knowledge and soft-skill development along with regular academics. To accelerate the learning, Internet facility with Wi-Fi connectivity is made available throughout the MGU campus to support the students in enhancing their knowledge with easy digital access. Faculty and students progression is actively monitored by the Head of Institution (PRINCIPAL) based on the reports and are done regularly.

Programme Specific Outcome - MBA Travel & Tourism Management

The UCCBM College has the mechanism for delivery and documentation of the curriculum set by the University to achieve the educational, social and cultural objectives. The process involves a number of specific decisions taken at the Staff Council and Department Committees to determine workload, allocation of work, preparation of Time Table and recruitment. The College identifies extension and tertiary activities that dovetail into teaching material and enrich it further. Every department has the space to intervene to enhance and enrich the learning and

learning outcomes – research and knowledge – through the curriculum. Departments organize field trips and visits for hands-on training, organize Seminars, Conferences, Workshops, Symposia, Student Paper Presentations and Projects to supplement and complement the

COURSE OUTCOMES – M.B.A. TTM				
S. NO	**CODE**	**PAPER**	**PAPER TITLE**	**OBJECTIVE**
	SEMESTER-I			
1	1.1	I	Management and Organizational Behaviour	• The objective of the course is to impart the fundamental concepts of Management theories and practice. This course will form a foundation to study other functional areas of Management; also provides an insight into behavioral issues pertaining to Organizations.
2	1.2	II	Principles and Practices of Tourism	• To understand the significance of employee relations in modern organizations and various legislations relating to employees relations.
3	1.3	III	Marketing of Tourism	• This module is intended to offer a comprehensive introduction to the management of marketing functions, structures and institutions and their role in the contemporary economic and social development
4	1.4	IV	Elective –I 1.Geography of Tourism 2.Economics for Toursim	1. To understand the significance of employee relations in modern organizations and various legislations relating to employees relations. 2. To acquaint the students withmoderns business practices

				and to provide an overview of the role of technology in business transactions.
5	1.5	V	Elective –II 1.Quantitative Methods 2.Information Technology for Tourism	1.The objective of the course is to familiarize the students with the process of entrepreneurship and the institutional facilities available to an entrepreneur in India. 2. This module is intended to offer a comprehensive introduction to the management of marketing functions, structures and institutions and their role in the contemporary economic and social development.
6	1.6	VI	Computer Lab Practicals (MS-EXCEL Lab)	• The objective of this course is to provide basics of I.T and it's applications through MS Word, MS PowerPoint and MS Excel.
	SEMESTER-II			
1	2.1	I	HRM In Tourism Organizations	• Human Resource Management: Gaining a Competitive advantage – Responsibilities and Roles HR Departments perform – Changing nature of the HRM function – Competitive Challenges influencing HRM.
2	2.2	II	Accounting and Finance for Tourism	• This paper focuses on business ethics and its relevance in the business field and helps to

				understand This module is intended to offer a comprehensive introduction to the management of marketing functions, structures and institutions and their role in the contemporary economic and social development.
3	2.3	III	Event Management	• The concepts of ethics and social responsibility in the current business environment
4	2.4	IV	Elective-I 1.Itinery Planning and Costing 2.Rural Hertitage and Tourism Development	1.The objective of the course is to familiarize the students with the consumer behavior. 2. To understand the significance of employee relations in modern organizations and various legislations relating to employees relations.
5	2.5	V	Elective-II 1.Business Research Methods 2.Principles and Practices of Hospitality	1.This course aims at providing theoretical foundations, designing and methods of reward and remuneration strategies practiced in business organizations. 2. The course aims at familiarizing the students with the production process and related issues in industrial Units. It introduces the students to aspects like quality, Inventory, Maintenance, materials management; and method analysis.
6	2.6	VI	Statistical tools using Excel -Lab	• Statistical tools using

				Time series: forecasting Method of least squares, moving average method. Inference and discussion of results.
	SEMESTER-III			
1	3.1	I	Entrepreneurship Development in Tourism	• The purpose of this paper is to enable the students learn nature scope and structure of International Business, and understand the influence of various environmental factors on international business operations.
2	3.2	II	Tourism Laws and Conventions	• The course aims at familiarizing the students with the production process and related issues in industrial Units. It introduces the students to aspects like quality, Inventory, Maintenance, materials management; and method analysis.
3	3.3	III	Personality Development and Cross Cultural Skills	• To understand the significance of employee relations in modern organizations and various legislations relating to employees relations.
4	3.4	IV	DSElective-I 1.Travel Management 2.Tour Guiding and Interpretation 3.Tourism Services Management	1.To understand the need for training and development and various methods of training and development. 2. The objective of the course is to familiarize the students with

				the consumer behavior. 3. The concepts of ethics and social responsibility in the current business environment
5	3.5	V	DSElective-I 1.Travel Management 2.Tour Guiding and Interpretation 3.Tourism Services Management	1.This paper focuses on business ethics and its relevance in the business field and helps to understand This module is intended to offer a comprehensive introduction to the management of marketing functions, structures and institutions and their role in the contemporary economic and social development. 2.The objectives of the course is to provide the causes for stress and the techniques of handling stress. 3. To acquaint the students withmoderns business practices and to provide an overview of the role of technology in business transactions.
	SEMESTER-IV			
1	4.1	I	Strategic Management	• The objective of the course is to enable the learners to comprehend with different business strategies and also to enable them with strategic orientation required in conducting the business.
2	4.2	II	International Tourism	• To impart basic knowledge of the concepts and tools of TOURISM as relevant to industrial organisation and to

				provide an understanding of the role of TOURISM in the overall strategic setting.
3	4.3	III	Tourism Products of India	• the concepts of ethics and social responsibility in the current business environment
4	4.4	IV	DSElective-III 1.Adventure Tourism 2.Managing Sales &Promotion in Tourism 3.Travel Agency Management	1.Adventure tourism is **a type of tourism in which tourists engage in adventure activities such as trekking, climbing, rafting, scuba diving, or the likes**. Adventure tourism gains much of its excitement by allowing the tourist to step outside their comfort zone. 2. **Business development managers or outside sales managers are a driving force in the promotion of travel and tourism worldwide**. They are supplied with marketing materials and promotional offers by their companies and sent out into the market to find new customers. 3. company which acts as an intermediary in the sales and. promotions of different travel related services , such as. accommodation , airlines, railways, road transport , cruises on behalf of the suppliers and earns commission.
5	4.5	V	DSElective-IV 1.Front Office Management 2.Air Travel Ticketing & Fare Construction	1.Front office management is defined as **managing the parts of a company such as the sales staff and customer service staff that come into contact with customers**. Managing the sales

			3.Recreation &Wellness Tourism	staff and marketing staff that come into contact with customers is an example of front office management. noun. 2. Fares and Ticketing is **a niche specialisation of the Hospitality and Travel field**. Most colleges offer short-term Fares & Ticketing Courses. 3. Wellness tourism advocates suggest that vacations **improve physical well-being, happiness, and productivity**, citing that health-oriented trips give travelers a fresh perspective and positively affect creativity, resilience, problem solving, and capacity for coping with stress.
6	4.6	VI	Project work Viva-Voice	• The objective of the course is to familiarize the students with the process of entrepreneurship and the institutional facilities available to an entrepreneur in India

prescribed curriculum in tangential ways. The curriculum is further documented and effectively

delivered by e-resources by the faculty. Department organize their academic tasks and activities accordingly. These mechanisms ensure the smooth and effective delivery and documentation of the curriculum. Teachers are encouraged to use teaching aids like power point and multimedia presentation making their classes more interactive and interesting. College invites the resource persons from the industry who conducts workshops on core subjects and career guidance. College conducts the campus recruitment every year by training and placement cell. The college conduct curricular and co-curricular activities which enrich knowledge of students and help them to develop the leadership qualities.

MAHATMA GANDHI UNIVERSITY, NALGONDA
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PROGRAMME NAME: M.B.A. FIVE YEAR INTEGRATED
PROGRAMME CODE: 685

Programme Outcome - Integrated MBA five year

The University college of Commerce and Business Management department has five year Integrated MBA Programme designed by Board of Studies of MGU. The staff members holding position as committee members of Board of Studies and Board of Examination represent to the university and give suggestions regarding changes in the curriculum development and deployment during the BOS and BOE meetings. The college plans the academic calendar as per University academiccalendar. The Teachers prepare lesson plan and teaching plan. Review meetings are conducted by the Principal to monitor the progress of the completion of syllabus. Remedial classes are conducted for students lagging in understanding concepts and to bring them on par with the rest of the class. Teachers are encouraged to utilize facilities provided by institution's support materials, books and refer additional teaching materials and journals that would enrich the knowledge needed to effectively deliver the classes. Teachers along with students are encouraged to do field visits and do the projects related to their subjects. The college conducts Faculty Development Programmes every year. Teachers are encouraged to use teaching aids like power point and multimedia presentation making their classes more interactive and interesting. College invites the resource persons from the industry who conducts workshops on core subjects and career guidance. College conducts the campus recruitment every year by training and placement cell. The college conduct curricular and co-curricular activities which enrich knowledge of students and help them to develop the leadership qualities.

Programme Specific Outcome - Integrated MBA five year Course

At the beginning of each academic session, college prepares its proposed academic calendar, which is uploaded in the college website. Students are informed about the academic calendar of the college notifying the probable teaching days, dates of internal examinations, vacations etc. 2. Orientation programme is organized every year for newly admitted students to make them aware of the mechanism for curriculum delivery and implementation 3. Routine is prepared and circulated by different departments. Routine is prepared strictly in accordance to the number of credit points mentioned in the prescribed syllabus of each course offered by the departments. 4. Based on the departmental routine, departments conduct meetings for allotment of classes and syllabus distribution among the teachers. Students are given details of teaching assignment of each teacher at the beginning of a session by the department 5. Based on the teaching assignments allotted in the syllabus distribution, teachers prepare their "teaching plans" according to the number of lectures allotted in the university syllabus for each topic 6. Along with the traditional chalk and talk method, teachers often use power-point projections during the lectures to demonstrate topics 7. Class tests/surprise test and student seminars are held after

completion of a section of the syllabus and periodic review of performance of students is undertaken. 8. Tutorial classes are held in some departments within class routine hours. 9. Extra classes are also held during the summer and winter vacations every year to keep pace with the industry requirements. 10. Post-graduate students are specially trained to handle assignments, open-house seminars and dissertation to prepare themselves for academic research in future. 11. Interactive sessions with students. Special care is taken to address the problems of slow learners, advanced learners and first generation learners. Social net-working sites are also used by some departments for interaction between faculty and students beyond the class hours 12. Student satisfaction survey is conducted by IQAC to improve the teaching learning process of each department.

COURSE OUTCOMES- MBAFIVE YEAR INTEGRATED

S. NO	**CODE**	**PAPER**	**PAPER TITLE**	**OBJECTIVE**
	SEMESTER-I			
1	1.1	I	English	• To encourage the students to speak English.To enable students to use English in day-to-day.
2	1.2	II	Second Language	• Students acquire knowledge of the historical events of various countries thereby enhancing their personality.
3	1.3	III	Business Organization	• The objective of this course is to enable the student to know about various forms of business organizations.
4	1.4	IV	Business Accounting	• The objective of this course is to provide basic knowledge of accounting.
5	1.5	V	Basic Statistics	• The objective of course is to make the students to learn the basic statistical tools useful for Business.
6	1.6	VI	Indian Hertiage and Culture	• The cultural heritage management is the measure aimed at **ensuring the viability, identification, documentation, research, preservation, protection,**

				promotion, enhancement, transmission as well as revitalization of cultural heritage.
7	1.7	VII	Seminar Presentation	• As the presenting group, you essentially organize the seminar session. Your main goal is to **provide your audience with input to a given topic**. This input serves as the basis for discussion during „your" session.
	SEMESTER-II			
1	2.1	I	English	• To encourage the students to speak English.To enable students to use English in day-to-day.
2	2.2	II	Second Language	• Students acquire knowledge of the historical events of various countries thereby enhancing their personality.
3	2.3	III	Principle of Management	• The objective of this course is to enable students to understand the basics of management principles
4	2.4	IV	Business Economics	• The Objectives of this course is to facilitate the students to learn the concepts of economics and apply them in real life situations.
5	2.5	V	Business Communication	• To understand the concept, process and importance of communication 1. To gain knowledge of media of communication 2. To develop skills of effective communication-both written and oral 3. To help students to acquaint with application

				of communication skills in the business world.
6	2.6	VI	Envirnomental Studies (NC)	• **Creating the awareness about environmental problems among people**. Imparting basic knowledge about the environment and its allied problems.
7	2.7	VII	Business Best Practices&Success stories of Emerging leaders -Seminar	• The student may select the following corporate practices or any other practices and study with reference to any company.
	SEMESTER-III			
1	3.1	I	English	• To encourage the students to speak English.To enable students to use English in day-to-day.
2	3.2	II	Second Language	• Students acquire knowledge of the historical events of various countries thereby enhancing their personality.
3	3.3	III	Legal Aspects of Business	• The objective of this course is to create awareness of the various laws pertaining to the business.
4	3.4	IV	Business Environment	• The objective of the course is to create the awareness of framework of business environment.
5	3.5	V	Cost Accounting	• The objective of this course is to make the students to learn the basics of cost accounting system.
6	3.6	VI	Information Technology for Managers	• The Objective of this course is to make the students to learn the use of computers and their application.

7	3.7	VII	MS Office ,MS word,PPTS&DOS Command -Lab	• The objective of the course is to familiarize the students with the process of entrepreneurship and the institutional facilities available to an entrepreneur in India
	SEMESTER-IV			
1	4.1	I	English	• To encourage the students to speak English.To enable students to use English in day-to-day.
2	4.2	II	Second Language	• Students acquire knowledge of the historical events of various countries thereby enhancing their personality.
3	4.3	III	Management Accounting	• The Objective of this course is to impart the knowledge of Management Accounting tools for decision making.
4	4.4	IV	Business Ethics &Corporate Governance	• The objective is to able to understand ethical and psychological dimensions to contain cybercrimes and also will be able grasp the important issues related to corporate governance.
5	4.5	V	Production Management	• The objective of this course is provide the knowledge of operations management i.e scheduling of production operations, quality control, materials and stores management.
6	4.6	VI	Fundamentals of Income Tax	• The Objective of the course is to provide the candidates with sound knowledge of the important provisions of the Income Tax law and their applications.
7	4.7	VII	Fundamentals of IT lab-MS Excel & MS Access	• The objective of the course is to familiarize the students

				with the process of entrepreneurship and the institutional facilities available to an entrepreneur in India
	SEMESTER-V			
1	5.1	I	Principles of Marketing Management	• This paper is intended to familiarize the students with the Concepts of Marketing.
2	5.2	II	Principles of Financial Management	• The objective of this course is to impart the basic knowledge of Principles of Financial Management.
3	5.3	III	Principles of Human Resources Management	• The objective of this course is to impart the knowledge of Responsibilities and Objectives of HRM, Recruitment of selection, Need for Man power Training, Methods of compensation, Managing careers and Basic Principles and guidelines for effective handling of Industrial disputes and Industrial relations to the students.
4	5.4	IV	Business Process Reengineering	• This course has been designed to develop an appreciation of process view of business and redesign thereof. The participants would be able to develop an understanding of the use of information technology for process redesign.
5	5.5	V	Banking & Insurance Management	• The objective of this course is to make the students to learn the concepts of banking and insurance and to gain an insight on financial services.
6	5.6	VI	Decision Support System	• The objective of this course

				is to enable students to understand the basics of management principles
	SEMESTER-VI			
1	6.1	I	Adverstising and Sales Promotion	• The objective of this course is to familiarize the students with the basic concepts, tools and techniques of advertising used in marketing.
2	6.2	II	Training and Development	• To train the students to understand the learning environment of a firm. The knowledge so obtained will make them capable of providing training to Human Resource of a business firm.
3	6.3	III	Project Management	• The objective of the course is to enable the learners to comprehend with different project management concepts, measurement and control for business.
4	6.4	IV	Business Taxation	• To provide basic knowledge of business tax procedures and management under different provisions of the Income tax.
5	6.5	V	Corporate Law & Governance	• The objective of this course is to impart the knowledge of company management, legal provisions of company meetings, borrowings and investment of companies, winding up formalities and Corporate Governance importance.
6	6.6	VI	Project Work & Viva -Voice	• The objective of the course is to familiarize the students with the process of entrepreneurship and the institutional facilities available to an entrepreneur

				in India

	SEMESTER -VII			
1	7.1	I	Management and organisation behaviour	• To familiarize the students with the behavioral patterns of human beings at individual and group levels in the context of an organization, which in turn is influenced by the environment, enveloping it. The course aims to enhance the ability of the students in terms of the knowledge, prediction and control of human behavior in an organization.
2	7.2	II	Financial Accounting and Analysis	• The objective of this course is to familiarize the students with the mechanics of preparing and Presentation of financial statements of an organization. Students are expected to analyze and interpret financial statements in this course.
3	7.3	III	Marketing Management	• The objective of this course is to make familiar the students with basic marketing concepts and Planning, analysis and implementation and control of marketing Programmes.
4	7.4	IV	Elective- 1 1. Business Law & Environment 2. Managerial Economics	1.The objective of this course is to create Legal Awareness and give exposure to various laws and acts which have impact on business and Industry 2. The course is to familiarize the students with basic concepts and techniques of micro economic analysis and its applications to managerial decision making.
5	7.5	V	Elective-2 1. IT Applications for Management	3. The learning outcome is that the students should be able to comprehend the fundamentals

			2. Managerial Communication	of Information Technology and its' application for Management. 4. The objective of the course is to familiarize the students with the process of entrepreneurship and the institutional facilities available to an entrepreneur in India
6	7.6	VI	Computer Lab Practicals (MS- Excel Lab)	• The objective of this course is to provide basics of I.T and it's applications through MS Word, MS PowerPoint and MS Excel.
	SEMESTER-VIII			
1	8.1	I	Human Resource Management	• The objective of this course is to give students basic concepts of Human Resource management, its functions, methods and applications.
2	8.2	II	Financial management	• The objective of this course is to acquaint the students with the broad framework of financial decision making in a business.
3	8.3	III	Statistics for Management	• The objective of this course is to make familiar the students with basic concepts statistics and its application in business.
4	8.4	IV	Elective- III 1. Operations Management 2. Customer Relationship Mangement	3. The objective of this course is to provide the knowledge of production department and its operations in business. 4. The objective of this course is to understand the role, value and prospects of CRM and to provide managerial insights into the process of forming, managing and enhancing customer relationships.
5	8.5	V	Elevtive- IV 1. Operations Research 2. Financial Institutions & Markets	3. : The objective of this course is to acquaint the student with the applications of Operations Research to business and industry and help them to grasp

				the significance of analytical techniques in decision making. 4. : To acquaint the students with Financial Markets and its various segments. To give the students an understanding of the operations and developments in financial markets In India.
6	8.6	VI	statistical tools using Excel- Lab	• Statistical tools using Time series: forecasting Method of least squares, moving average method. Inference and discussion of results.
	SEMESTER-IX			
1	9.1	I	Business Research Methods	• The objective of this course is to give students a complete exposure to all aspects of conducting research, analysing and interpreting the data with tools.
2	9.2	II	Total Quality Management	• The objective of this course is to provide the knowledge of Quality dimensions, tools and techniques relevance in the business.
3	9.3	III	International Business	• The objective of this course is to provide inputs of global business, managing business internationally.
4	9.4	IV	DS Elective- I 1. Investment Management (F) 2. Product & Brand Management(M) 3.Compensation Management(HR) 4. Enterprise Resource Planning (Sys)	1.The objective of this course is to enhance the knowledge of types of investments with risk and returns. Various models and techniques for effective investment decisions 2. The objective of the course is to make the learners' adept in concepts of Product, New Product Development and Testing; also it provides an insight into fundamentals of branding. 3. The objective of this course is to impart the knowledge to students in the areas of compensation and employee behavior, compensation system, Compensation Benefits and compensation challenges.

				4. The objective of this course is to impart the knowledge to students in the areas of compensation and employee behavior, compensation system, Compensation Benefits and compensation challenges.
5	9.5	V	DS Elective-II 1. International Finance (F) 2.Promotion and Distribution Management(M) 3. Organization Development(HR) 4.DataBase Systems(SYS) Laboratory 4.1 Practicals in Database Environment	1.The course objective is to understand the international financial system, various theories and models for foreign direct investments. 2. The objective of the course is to make the learners' adept the concepts of Promotion and distribution with various types of media, personal selling and promotion. 3. The objective of this course is to impart knowledge about OD interventions for individual, team and organizational development. 4. SQL-SQL commands for data definition & data manipulation, viewsprocedures - indexing, PL/SQL, forms design process, triggers, SQL report writer, SQL menus.
	SEMESTER-X			
1	10.1	I	Strategic Management	• The objective of the course is to enable the learners to comprehend with different business strategies and also to enable them with strategic orientation required in conducting the business.
2	10.2	II	Supply Chain Management	• The objective of the course is to enable the learners to comprehend with basics of supply chain management, logistics, and networks in any business.
3	10.3	III	Entrepreneurship Development	• The objective of this course is to provide knowledge of becoming entrepreneur through entrepreneurship concept, types, programs and institutions.
4	10.4	IV	DS Elective- III	1.The objective of this course is to provide knowledge of types of risk,

			1. Financial Risk Management (F) 2. Consumer Behaviour (M) 3Performance Management(HR) 4. E- Commerce (Sys)	measurement of risk and techniques for investment decision making. 2. The course objective is to Impart the skills in Students for understanding the consumer behavior inbusiness decisions. 3. The objective of this course is to explain the intricacies of performance management, various tools and models for HR decisions. 4. The course aims at familiarizing the students with the production process and related issues in industrial Units. It introduces the students to aspects like quality, Inventory, Maintenance, materials management; and method analysis.
5	10.5	V	DS Elective-IV 1. Financial Services & Systems (F) 2.Services Marketing(M) 3. Labour Laws & Employee Relations (HR) 4.Advance Excel (SYS)+ Lab(SYS)	1.The objective of this course is to provide information about various financial services and systems. 2. : The objective of this course is to give student a complete exposure to all aspects of service, design, standards, delivering and performing service. 3. The objective of this course is to provide information about labour laws, various acts and industrial relations; it's relevance in HR decisions. 4. To impart basic knowledge of the concepts and tools of SYSTEMS as relevant to industrial organisation and to provide an understanding of the role of SYSTEM in the overall strategic setting.
6	10.6	VI	Project Work	The objective of the course is to familiarize the students with the process of entrepreneurship and the institutional facilities available to an entrepreneur in India.

MAHATMA GANDHI UNIVERSITY, NALGONDA
(*Accredited with "B" Grade by NAAC*)

PROGRAMME NAME: Ph.D. MANAGEMENT
PROGRAMME CODE: 680

Programme Outcome - Ph.D. Management Programme

PhD (Doctor Of Philosophy) in management is one of the highest academic degrees awarded in the study of management science. The degree was designed for those seeking academic research and teaching careers as faculty or professors in the study of management at business schools worldwide. The PhD programme was introduced with the following objectives, the objective of the course is to provide the necessary basic inputs and tools to manage the marketing, finance and Human Resource function. The course has been designed to provide the research students with knowledge of emerging issues and trends in markets and new innovations in the sector. The emphasis in the course will be on the practical knowledge along with the conceptual understanding of the subject. The course also aims at providing an international perspective in the field to the students. Ph.D. in Management studies is a doctorate program which gives a brief explanation to the critical management skills involved in structuring, planning, leading, and controlling an industry. This course helps candidates to understand management of an organization.

Programme Specific Outcome – Ph.D. Programme

PhD in Management is a three- to the four year doctoral programme in management studies. Candidates must have completed a postgraduate management course or have a basic degree from a recognised university to be eligible for the course. PhD in Management studies is a doctorate program which improves the candidates' skills in structuring, planning, leading, and controlling an industry. The course helps the candidate in understanding the management of an organization. The Ph.D. program at Mahatma Gandhi University is structured to enhance the inquisitive knowledge in pursuit of advancing the field of study with new knowledge. It allows students considerable flexibility to work on their topics of scholarly interest that satisfy their intellectual curiosity. This course helps candidates to understand management of an organization. It trains students to diagnose and suggest some solutions for operational and managerial problems.

COURSE OUTCOMES -PH.D. MANAGEMENT

S.NO	CODE	PAPER	PAPER TITLE	OBJECTIVE
1	MG.R 1701	1	RESEARCH METHODOLOGY (Common paper)	The objective of this course is to give students a complete exposure to all aspects of conducting research, analysing and

				interpreting the data with tools.
2	MG.R 1702	II	GENERAL MANAGEMENT	To familiarize the students with the behavioral patterns of human beings at individual and group levels in the context of an organization, which in turn is influenced by the environment, enveloping it. The course aims to enhance the ability of the students in terms of the knowledge, prediction and control of human behavior in an organization
3	MG.R 1703	II	FINANCIAL MANAGEMENT	The objective of this course is to acquaint the students with the broad framework of financial decision making in a business
4	MG.R 1704	II	MARKETINGMANAGEMENT	The objective of this course is to make familiar the students with basic marketing concepts and Planning, analysis and implementation and control of marketing Programmes.
5	MG.R 1705	II	HUMANRESOURCE MANAGEMENT	The objective of this course is to give students basic concepts of Human Resource management, its functions, methods and applications.
6	MG.R 1706	II	TOURISM THEORIES, PRACTICES AND PHILOSOPHIES	This paper will help the scholars gain conceptual clarity on the evolved theories, practices and philosophies with regard to the tourism and its allied activities. To impart basic knowledge of the concepts and tools of TOURISM as relevant to

				industrial organisation and to provide an understanding of the role of TOURISM in the overall strategic setting.

MAHATMA GANDHI UNIVERSITY, NALGONDA
(*Accredited with "B" Grade by NAAC*)

DEPARTMENT OF MATHEMATICS
PROGRAMME NAME: M.Sc. MATHEMATICS
PROGRAMME CODE: 505

M.Sc. Mathematics - Program Outcomes

PO1. Inculcate critical thinking to carry out scientific investigation objectively without being biased with preconceived notions.

PO2. Equip the student with skills to analyze theproblems, formulate an hypothesis, evaluate and validate results, and draw reasonable conclusions .

PO3. Prepare students for pursuing research or careers in industry in mathematical sciences and allied fields

Program Specific Outcome of M.Sc. (Mathematics)

PSO1. Understanding of the fundamental axioms in mathematics and capability of developing ideas based on them. Inculcate mathematical reasoning.

PSO2. Prepare and motivate students for research studies in mathematics and related fields. Provide knowledge of a wide range of mathematical techniques and application of mathematical methods/tools in other scientific and engineering domains.

PSO3. Provide advanced knowledge on topics in pure mathematics, empowering the students to pursue higher degrees at reputed academic institutions.

PSO4. Nurture problem solving skills, thinking, creativity through assignments, project work. Assist students in preparing (personal guidance, books) for competitive exams e.g. NET, GSET, GATE, etc.

Course Outcome of M.Sc. (Mathematics)

SEMESTER 1

Sub. Code: MM-101, Core Sub. 1: Algebra

Upon completion of the course student will be able to

CO1. Understand basic principles of algebraic structures like groups, Normal sub groups, Homomorphism's, Isomorphism, Conjugacy and G-Sets, Normal series, Solvable groups,Nilpotent groups

CO2.Recognize and understand the concept ofStructure theorems of groups,theorems, Direct Products, Finitely generated abelian groups, Invariants of finite abelian groups, Sylow theorems.

CO3. Understand the concept of Ideals, Maximal ideals, Prime Ideals and Nilpotent and Nil Ideals and Zorns Lemma.

CO4: Recognize and understand the concept ofPrinciple Ideal, Euclidean domains, unique factorization domains. Polynomial rings and Rings of Fractions.

Sub. Code: MM-102, Core Sub. 2: Real Analysis

Upon completion of the course student will be able to

CO1. Understand, basic definitions in analysis like open set, closed set, perfect set, compact set and related theorems..

CO2. Define and understand compact set , continuous functions and unifom continuity.

CO3. Define, understand and utilize the concept Riemann stiljes integral and thei properties.

CO4. To learn uniform convergence, point wise convergence and related concepts..

Sub. Code: MM-103, Core Sub. 3: Discrete Mathematics

Upon completion of the course student will be able to

CO1. Understand the lattices and posets..

CO2. To learn the concepts of Boolean algebra and Boolean functions.

CO3. Understand the concepts of Graph theory eulerainpath andeulers formula and its applications.

CO4. To learn the concepts of Trees and cutsets and problems on spanning trees.

Sub. Code: MM-104, Core Sub. 4: Elementary Number Theory

Upon completion of the course student will be able to

CO1. Understand the basic concepts of number theory, Recognize and identify the properties of prime numbers.

CO2. Recognize and identify the properties Arithmetic functions.The Dirichlet product of arithmetical functions.

CO3. Understand the concepts of congruences.

CO4. Understand and Recognise the concepts of Quadratic residues and Quadratic non residues,

Quadratic residues and the Quadratic Reciprocity law.

Sub. Code: MM-105, Core Sub. 3: Mathematical Methods

Upon completion of the course student will be able to

CO1. To learn the Existance and uniqueness solutions of first order differential equations and partial differential equations.

CO2. To study the solutions of partial differential equations of order two with variable coefficients.

CO3. Power series solution of ODE and Recurrance relations and its related theorems..

CO4. Solutions of Bessel functions, Hermites polynomials and problems on them..

SEMESTER 2

Sub. Code: MM-201, Core Sub. 1: Advance Algebra

Upon completion of the course student will be able to

CO1. To understand the algebraic extensions of fields and ireeduciable polynomials.

CO2. To learn Normal and separable extensions and splittings..

CO3. To study the Galois theory and fundamental theorem of algebra..

CO4: To study the applications Galois theory

Sub. Code: MM-202, Core Sub. 2: Advanced Real Analysis

CO1. Understand the concept of algebra of sets, outer measure and lebesgue measure.

CO2. To learn the Lebsegue integral of a bounded functions and lelated theorems..

CO3. To study the differentiation of monotone functions and functions of bounded variation..

CO4. To learn the concepts of obsolute continuity and Lp spaces.

Sub. Code: MM-203, Core Sub. 2: Functional Analysis

Upon completion of the course student will be able to

CO1. Understand the concept of Normed Linear Spaces and Banach Spaces.

CO2. Understand the concept of Inner product spaces and Hilbert Spacestheorems related toorthonormal sequences, Bessels inequality.

CO3. Theorems related to Riesz theorems and Hilbert adjoint operators.

CO4. State and proveHahn-Banach Theorem, uniform boundedness theorem, open mapping theoremand closed graph theorem.

Sub. Code: MM-204, Core Sub. 4: Theory of Ordinary Differential Equations

Upon completion of the course student will be able to

CO1. Understand the brief idea about linear differential equations of higher and its applications.

CO2. To learn the existence and uniqueness of solutions and its related theorems like picards, fixed point theorem.

CO3. Analysis of methods of non linear differential equations.

CO4. Understand, oscillation theory for linear differential equations of second order and related theorems..

Sub. Code: MM-205, Core Sub. 5: Topology

Upon completion of the course student will be able to

CO1. Understand, definitions of topological spaces, Basis and sub basis.

CO2. Understand,definitions ofcomact spaces and related theorems, Tychonoff's theorem.

CO3. Definition of Housdroff spaces, Urysons lemma, Tietz extension theorem .

CO4. Understand, definitions of connected spaces, totally disconnected spaces and locally connected spaces.and related theorems

M.Sc. SEMESTER III

Sub. Code: MM-301, Core Sub. 2: Complex Analysis

Upon completion of the course student will be able to

CO1. Understand the concept of complex plane and generalize the concept of coordinate plane and Cauchy Riemann equations..

CO2. Determine continuity/differentiability/analyticity of a complex function and find the derivative of a function.

CO3. Evaluate a contour integral using parameterization, fundamental theorem of calculus and Cauchy's integral formula.

CO4. To study the CavhyGourasat theorem, Fundamental theorem of algebra and Maximum modulus principal.

Sub. Code: MM-302, Core Sub. 2: Elementary Operator Theory

Upon completion of the course student will be able to
CO1. Understand the concept of spectrum, resolvent sets and Inversion Theorem, spectral mapping theorem.

CO2. To study the spectral properties of compact linear operators.

CO3. To learn the spectral properties of bounded self adjoint operators and positive operators.

CO4. To learn the projection operators and spectral family of bounded self adjoint operators.

Sub. Code: MM-303, Core Sub. 3: Operations Research

Upon completion of the course student will be able to
CO1. To study the Linear programming problems, simplex methods.

CO3. To learn the transportation problems.

CO4. To analyse the Dynamic programming problems.

CO5. Network problems.

Sub. Code: MM-304, Core Sub. 4: Integral Equations

Upon completion of the course student will be able to
CO1. Understand the concepts of linear differential equations and Volterra integral equations.

CO2. Solutions of Integro differential equations.

CO3. To solve the Fredholm integral equations

CO4. To solve the applications of Integral equations.

Sub. Code: MM-305, Core Sub. 5: Numerical Techniques

Upon completion of the course student will be able to

CO1. Apply suitable and effective methods called Numerical Methods, for obtaining approximate representative numerical results of the problems using Bisection, Newton-Raphson method Mullers method etc..

CO2. Solve the algebraic equations usin Gauss elimination, Triangularization method, Cholesky method and partition method.

CO3. To learn Interpolation methodslike Newto forward, backward, stirling, Bessel, Hermittee and piesewise methods.

CO4. To learn Numarical differentiation and Numarical methods and solutions od differential equations using Numarical methods.

M.Sc. SEMESTER IV

Sub. Code: MM-401, Core Sub. 2: Advanced Complex Analysis

Upon completion of the course student will be able to

CO1. Understand the concept of sequences and series, Taylors and Laurents series and power series.

CO3Cauchy residue theorem and Analyze and classify the singularities of complex function in given region.

CO4. Evaluation of improper integrals from Fourier analysis and Roaches theorem , argument principal.

Sub. Code: MM-402, Core Sub. 2: General Measure theory

CO1. Understand the concept measure spaces and general convergence theorem.

CO2. To study the signed measures and theorems.

CO3. To learn the theorems on outer measure and measurability..

CO4. To learn the inner measure.

Sub. Code: MM-403, Core Sub. 3: Banach Algebra

Upon completion of the course student will be able to

CO1. Understand the definitions of algebra, banach algebra, singular element and gelfand formula for spectral radius.

CO2. To learn some concepts on gelfand transforms and spectrum in L(E).

CO3. To understand the basics in C-* algebra.and states on C* algebra.

CO4. To learn the GelfandNewmark representation theoem and spectral sets.

Sub. Code: MM-404, Core Sub. 4: Finite Difference Methods

Upon completion of the course student will be able to
CO1. To learn the partial differential equations and various difference methods.

CO2. Difference methods for parabolic partial differential equationson one space and two space dimension.

CO3. Difference methods for hyperbolic partial differential equationson one space and two space dimension.

CO3. Numaricalmethods for elliptic partial differential equationsand difference methods for linear boundary value problems.

Sub. Code: MM-405, Core Sub. 5: Calculus of Variations

Upon completion of the course student will be able to
CO1. To learn the definitions of functionals and fundamental lemma of cov.

CO2. Solve the problems on minimum surface of revolution and vibrational problems.

CO3. To learn isometric problems and eulers equation.

CO4. To studt the applications of COV, Hamilton principale.

MAHATMA GANDHI UNIVERSITY, NALGONDA
(*Accredited with "B" Grade by NAAC*)

PROGRAMME NAME: Ph.D. MATHEMATICS
PROGRAMME CODE: 541

Programme Outcomes - Ph.D. Mathematics

The curriculum is designed according to guidelines of University Grant Commission (UGC) and National Accreditation and Assessment Council (NAAC) to achieve quality and excellence in higher education to accomplish the following objectives.

Students under PhD. Mathematics program should have acquired the following knowledge and skills:

PO1. Research Skills

a) The habit to read mathematical texts independently. b) To learn the qualitative and quantitative methodology c)Comprehension of the general framework of mathematical research; an understanding of the role of axioms, assumptions, theorems, proofs, and conjectures.

PO2. Computational skills

a) Proficiency in basic computational methods including pure and applied branches of mathematics.

b) Proficiency in preparation of documents in Latex format

c) To learn how to solve the problems using matlab.

d) Proficiency in computer-aided computations.

PO3. Analytical skills

a) An understanding of the basic rules of logic and proficiency in using them.

b) The ability to give counter examples to prove or disprove the derived/ existing results.

c) The ability to distinguish a coherent argument from a fallacious one.

d) The ability to derive general principles from examples.

e) The ability to formulate mathematical conjectures and to test them.

f) The ability to give complete mathematical proofs based on logic and mathematical concepts.

Ph.D. Mathematics – Program Specific Outcome

PSO1. To develop research level thinking in the field of pure and applied mathematics.

PSO2. To learn Matlab and Latex writing format

PSO3. To improve your own learning and performance.To develop abstract mathematical thinking.

MAHATMA GANDHI UNIVERSITY, NALGONDA

(*Accredited with "B" Grade by NAAC*)

COURSE OUTCOMES – Ph.D. Mathematics

Core Sub. Paper I: Research Methodology and Technical writing

Upon completion of the course student will be able to

CO1. Understand basic concepts in Research Methodology, research design and plagiarism.

CO2.To learn about science citation of journals and mathematics subject classification

CO3. To learn the papers in Latex format

CO4: To study the Matlab software

Core Sub. Paper II(a): Advanced Analysis

Course Outcomes:

Upon completion of the course student will be able to

CO1. Understand the abstract integration and Lebesgue integration

CO2. Study the applications of Banach fixed point theorem.

CO3. To study the uniform approximations in Normed spaces.

CO4. Concepts of Banach algebra and topological divisiors of zero..

Core Sub. Paper II(a): Fluid Mechanics

Upon completion of the course student will be able to

CO1. Study the Kinamatics, stream functions and irrotational motion

CO2. Studythe Navier stokes equations and fluid flow in parallel plates.

CO3. To study the dimensional analysis, boundary layer equation.

CO4. To study the Magneto hydro dynamics and MHD approximation

MAHATMA GANDHI UNIVERSITY, NALGONDA
(*Accredited with "B" Grade by NAAC*)

DEPARTMENT OF CHEMISTRY
PROGRAMME NAME: M.Sc. CHEMISTRY
PROGRAMME CODE: 503

PROGRAM OUTCOMES OF M.Sc., CHEMISTRY

Knowledge Outcomes

PO1: Demonstrate and apply the fundamental knowledge of the basic principles in various fields of Chemistry.

PO2: Create awareness and sense of responsibilities towards environment and apply knowledge to solve the issues related to Environmental pollution.

PO3: Apply knowledge to build up small scale industry for developing endogenous product.

PO4: Apply various aspects of chemistry in natural products isolations, pharmaceuticals, dyes, textiles, polymers, petroleum products, forensic etc. and also to develop interdisciplinary approach of the subject.

Skill Outcomes

PO4: Collaborate effectively on team-oriented projects in the field of Chemistry or other related fields.

PO5: Communicate scientific information in a clear and concise manner both orally and in Writing.

PO6: Inculcate logical thinking to address a problem and become result oriented with a positive attitude.

PO7: Explain environmental pollution issues and the remedies thereof.

PO8: Apply the knowledge to develop the sustainable and eco-friendly technology in Industrial Chemistry.

Scientific Outcomes

PO9: Have developed their critical reasoning, judgment and communication skills.

PO10: Augment the recent developments in the field of green and eco-friendly reactions, Pharmaceutical, Bioinorganic Chemistry and relevant fields of research and development.

PO11: Enhance the scientific temper among the students so as to develop a research cultureand implementation of the policies to tackle the burning issues at global and local level.

PROGRAM SPECIFIC OUTCOMES OF M.Sc., CHEMISTRY

PSO-1 : Gain the knowledge of Chemistry through theory and practicals.

PSO-2: To explain nomenclature, stereochemistry, structures, reactivity and mechanism of the chemical reactions.

PSO-3: Identify chemical formulae and solve numerical problems.

PSO-4: Use modern chemical tools, Models, Chem-draw, Charts and Equipments.

PSO-5: Know the structure-activity relationship.

PSO-6: Understand good laboratory practices and safety.

PSO-7: Develop research oriented skills.

PSO-8 : Make aware and handle the sophisticated instruments/equipments.

PSO- 9 : Basic understanding of analytical chemistry.Knowledge of volumetric methods of analysis and gravimetric analysis.Study of spectro-analytical techniques and their applications to various chemicalsystems.

PSO-10 : Understanding of various organic reactions, rearrangement, cross-couplingreactions and applications.

MAHATMA GANDHI UNIVERSITY, NALGONDA

(*Accredited with "B" Grade by NAAC*)

COURSE OUTCOMES OF M.Sc., CHEMISTRY

SEMESTER-1

Paper-I: CH 101T (INORGANIC CHEMISTRY)

IC 01: Symmetry of Molecules :

Understand the concept of symmetry (operation & elements) & molecular point group. Able to classify the molecules based on point group. Able to visualize molecule in 3-D, understand the concept of symmetry elements and symmetry operations.know the point groups of molecules and understand symmetry considerations for optical activity and dipole moment.

IC 02: Bonding in Metal Complexes – I :

Able to compare the splitting pattern in different types of geometries (Oh, Td, distorted Oh, TBP, Linear etc.,) & calculate crystal field stabilization energy, magnetic behaviour of different complexes.

IC 03: Coordination Equilibria :

Have an idea about classification of metal complexes, stability constant & relationshipbetween them. Know the factors influencing on stability constant &methods for determiningit. Able to define the term (macro cyclic effect, cryptate effect & chelateeffect).

IC 04: Ligational Aspects of Diatomic Molecules:

Acquire knowledge about CO, NO& N2 as ligands. Able to draw molecular orbital structures of it & differentiation of bonding modes of it. Have an idea about chemical nitrogen fixation.

Paper-II: CH 102 T(ORGANIC CHEMISTRY)

OC-01: Stereochemistry:

Understand the Molecular Representations and Symmetry Elements of Organic Molecules. Student will be able to generalize the concept of stereochemistry and reaction pathway. Describe the stereo chemical and conformational structure of molecules.

OC-02: Reaction mechanism-I :

Judge the methods for the determination of organic reaction mechanism.

OC-03: Carbohydrates and Proteins:
Importanceand synthesis of monosaccharides containing functional groups such as amino, halo andsulphur. Structure elucidation and synthesis of sucrose.Chemical synthesis of di and tripeptides&Merrifield's solid phase synthesis.

OC-04: Heterocyclic Compounds :
Explains the nomenclature , synthesis and reactivity of Heterocyclic compounds. Predict the Chirality of the compounds. The application of reagents and other heterocycles for the synthesis of other heterocycles.

Paper-III: CH 103 T(PHYSICAL CHEMISTRY)

PC-01: Thermodynamics-I :
Get basic idea about fundamental laws of thermodynamics. Relate the thermodynamic properties of the system and the chemical composition. Understand the concept of entropy, 3rd law of Thermodynamics and evaluation of absolute entropy.

PC-02: Electrochemistry-I :
Acquire knowledge about electrochemical cell EMF, applications of EMF measurements and electrode polarization.Students will also have knowledge about different electrochemical reactions and different types of cells.

PC-03: Quantum Chemistry-I :
Understand the concept of quantum Mechanics, Variation theorem and its application. Gains the knowledge of Eigen functions. Understand the concept of particle in box and calculation of average values using wave function of particle in box.

PC-04: Chemical Kinetics-I :
Know the characteristics of radioactive decay, theory of a band g decay process and Differenttypes of reactors.

Paper-IV: CH 104 T (ANALYTICAL TECHNIQUES and SPECTROSCOPY- I)
ASP 01: Techniques of Chromatography:
Analyze the techniques of chromatography and generate quantification methods of HPLC and GC for industrial applications Expand skills in the scientific methods of planning, developing, conducting, reviewing techniques for separation and identification of compound in complex mixture.

ASP 02: NMR spectroscopy-I (1H NMR) :

Learners should be able to apply NMR spectroscopic techniques in solving structure of organic molecules. Interpret the NMR Spectra of organic compounds and gains knowledge on its applications in medicine and industries as a diagnostic tool.

ASP 03: Rotational and Vibrational spectroscopy :

Discriminate between harmonic and anharmonic vibrations. Interpret the Infra redabsorption frequencies of simple organic molecules. Calculate the relative populations of rotational and vibrational energy levels.

ASP 04: Electronic spectroscopy :

Gains knowledge on UV- Visible spectroscopy principles and instrumentation and interpret UV –spectra of organic molecules. Construct the absorption maxima of organic molecules with Woodward Fisher rules.

Paper CH 151P: Inorganic Chemistry Practicals :

To know about the Back titrations as well as Preparation of metal complexes.Prepare the exact solutions for quantitative analysis.

Paper CH 152P Organic Chemistry Practicals :

Learn about the synthesis ofvarious organic compounds.Students can prepare nitro and bromo derivatives.

Paper 153P Physical Chemistry Practicals :

Determination of density, surface tension and viscosity of liquids. Interpret the experimental results obtained by Conductometer, PH-meter &Polarimetry.

SEMESTER-II

Paper-I: CH 201T (INORGANIC CHEMISTRY)

IC 05: Reaction mechanisms of transition metalcomplexes :

Acquire the knowledge about different types of substitution reaction (SN1,SN2, SN1CB) & hydrolysis reactions (acid, base). Get concept about Trans effect, electron transfer reaction. Theories & application of Trans effect.

IC 06: Bonding in metal complexes-II :

Understand about the terms, state, microstate etc&calculation of microstate &determination of terms of different configuration .Able to draw orgel diagrams of S, P, D, and F terms.

IC 07: Metal Clusters :
Get the concept of capping rule, total electron count theory &poly skeletal electron pair theory .categories the types of clusters. Able to draw the structural patterns of different metal clusters.

IC 08: Biocoordination Chemistry :

Acquires knowledge about various elements functions in biological system, photosynthesis, PS-I, PS-II &vitamin B6 model system. Comparison between the haemoglobin, myoglobin,
heamocyanin&hemoerythrin.

Paper-II: CH 202T (ORGANIC CHEMISTRY)
OC-05: Conformational analysis (acyclic systems) :
Study of conformations in ethane & its derivatives**.**Understand the stereochemistry of organic molecules in detail.

OC-06: Reaction mechanism-II :

Aquire the knowledge about Evidenced based Nucleophilic Aromatic & Aliphatic Electrophilic reactions .By the concept of Neibhouring group participation enhancement of reaction rates can be determined.

OC-07: Reactive intermediates and Molecular rearrangements :
An idea of different Molecular Rearrangements.

OC-08: Natural products (Terpenoids and Alkaloids) :

Isolation of natural products&General methods of structure determination of Natural products. Students will gain knowledge about Alkaloids and Terpenoids.

Paper-III: CH 203T (PHYSICAL CHEMISTRY)

PC-05: Thermodynamics-II :
Acquire knowledge on Thermodynamic properties of ideal and non-ideal solutions, Concept of fugacity and activity coefficient, determination of fugacity and activity Coefficient.Learn to derive the equations of multi component phase equilibrium.

PC-06: Photochemistry-I :
Develop concept about electronically excited states and understand the photo physical processes. Learn to derive the expression of quantum yield and rate constants of various photo physical processes. Know about the types of photo chemical reaction, photo sensitization reaction and have an idea about the advancement of studying fast reaction – Principle of Flash photolysis.

PC-07: Quantum Chemistry-II :
Learn to derive Schrodinger equation for hydrogen atom using polar coordinates. Have an idea about the generation of quantum number from the solution of wave equations, radial distribution and representation of orbitals. Know about approximate method (Variation principle) and execution of the method to derive the wave function of many electron systems.

PC-08: Solid State Chemistry:
Acquire knowledge on the electronic properties of metals, insulators and semi conductors. Understand the theories and applications of superconductors and high temperature super conductors.

Paper-IV: CH 204 T(ANALYTICAL TECHNIQUES and SPECTROSCOPY - II)

ASP-05: Electro analytical Techniques :

Understands the instrumentation, principle of polarography, techniques and analyze the qualitative and quantitative applications. Understands the basics of thermo analytical methods, analyze the qualitative and quantitative applications.

ASP-06: NMR- II :
Learn about the different pulse sequences and applications of NMR spectroscopy to the structural characterization of molecules. Understand the principles and techniques of Advanced NMR and interpret the NMR spectroscopic data for the structural elucidation of molecules.

ASP-07: Mass Spectroscopy :
Illustrate the techniques of mass spectroscopy, interpret the fragmentation pattern of organic molecules. Compute the molecular formula of compounds using mass spectroscopic data.

ASP-08: Photoelectron & ESR spectroscopy :
Knows the Principle and Instrumentation of Photoelectron Spectroscopy, Interpretation of Vibrational spectral data for ionized (M+) species.Discriminates different oxidation state and chemical environment using spectroscopic data of X-ray photoelectron Spectroscopy. Understands working principle of ESR Spectroscopy, identify the basic components of ESR spectrometer, interpret the ESR Spectra and analyze the qualitative applications in medicine and industries.

Paper CH 251P : Inorganic Chemistry Practicals :
To provide practical training on gravimetric estimations and analysis and estimation of various metals from mixtures.An Ability to separate one component, two component and three component mixtures. Understanding of Ion-exchange chromatography for separation of metal ions.

Paper CH 252P : Organic ChemistryPracticals:
Identification of organic compounds & systematic qualitative analysis**.**Functional Group tests &Identification of unknown organic compounds from their IR, UV,^{1}H NMR and Mass.understand how to carry out different types of reactions and their workup methods.

Paper CH 253P: Physical Chemistry Practicals :

Determination of specific rotation of glucose and fructose.Titration of a mixture of strong and weak acids vs strong base.Calibration of a pH meter and measurement of pH of different solutions. Prepare the solution of the desired concentration and the desired volume. Plot accurate graphs of the desired scale for the calculations.

SEMESTER-III

Paper 1– CH (OC) 301T: Conformational Analysis, Asymmetric Synthesisand Biomolecules :

To understand the basic concepts of Conformational analysis of Cyclic Systems and Applications of Optical Rotatory Dispersion.Study of conformations of cyclohexane, mono, di and polysubstitutedcyclohexanes.Principles of asymmetric synthesis & study aboutChiral NMR Chiral derivitatizing agents.Methodologies in asymmetric synthesis and study about enzymes, nucleic acids and lipids.

Paper 2– CH (OC) 302T: Modern Organic Synthesis:

Able to apply various disconnection approaches & the retrosynthesis of organic compounds in designing of new compounds. Aquire Knowledge about the various new modern organic synthetic reactions and their mechanisms involving in the formation of C-C, C-X, C=C bonds.To know the importance of retrosynthesis in designing the synthesis of organic compounds.To impart knowledge about the mechanism & importance of the new synthetic reactions.

Paper 3: CH (OC) 303T: Organic Spectroscopy and Pericyclic reactions.
To know about the different types of spectroscopy and applications of spectroscopy in organic spectroscopy to elucidate the structure of the organic compounds.To develop theinterest and understanding of the theoretical basis for Pericyclic reactions and skills for the utilization of these reactions in the organic synthesis.Approaches for the interpretation of mechanism of pericyclic reactions and able to predict the stereochemistry & products ofthe Pericyclic reactions.

Paper-4 CH (OC) 304T: Photochemistry, Synthetic strategies and Green Chemistry
To study the synthesis & applications of various photochemical Reactions.Excited states ofaromatic compounds.electrocyclisation and sigmatropic rearrangementsDesign a green synthesis using principles of prevention of waste/by-products/toxic products, atom economy. Microwave assisted reactions in organic solvents and solvent free reactions, ultra sound assisted organic synthesis.

LABORATORY COURSES :
PAPER-V CH (O) 351P: Separation and identification of organicCompounds :

Separation of two component mixtures by chemical methods and their identification by chemical reactions & checking the purity of two components by TLC.

PAPER VICH (O)352P: Synthesis of organic molecules & isolation ofnatural products :
Synthesis of different Organic molecules through different types of reactions & isolation of natural products like tea leaves, Eucalyptus leaves and pepper.

SEMESTER-IV

Paper-1 CH (OC) 401T: Drug Design and Drug Discovery :
To explain the principles of drug design and drug discovery. To describe the ADME properties of drugs..To describe the Structure Activity Relationship in drug design and discovery. To explain the various parameters requires for QSAR study. To describe the principles and use of Combinatorial Chemistry in drug synthesis.

Paper CH (OC) 402T: Drug synthesis and mechanism of action :
Basic concepts of mechanism of drug action, drugs acting on metabolic process.DNA binding and nicking agents and drugs acting on receptors and ion channels and about chiral drugs.

Paper-3 CH (OC) 403T: Advanced Heterocyclic Chemistry :
Describe the structures of classes of heterocyclic aromatic organic compounds. Classify simple heterocyclic aromatic compounds as electron deficient or electron rich and explain their reactivity based on these properties. Apply organometallic reactions that applied in heterocyclic chemistry. Explain on a mechanistic level, reactions and synthesis of important electron deficient nitrogen containing heterocycles; pyridines, diazines and their benzo-condenced analogs.

Paper-4 – CH (OC) 404T(CB1): Advanced Natural Products :
To explain the basic classification and role of alkaloids.To explain the structural elucidation and degradation of alkaloids.To describe the synthesis and structure of alkaloids.To describe the stereochemistry of alkaloids.To explain the isolation and structural determination of alkaloids.To explain the terpenoids and its classification.To explain isoprene rule.To elucidate the structure of camphor.

Laboratory courses :
Paper CH (OC) 451P: Spectroscopic identification of organic compounds and Chromatography:
Identification of unknown compounds by IR,UV, ^{1}H NMR, ^{13}C NMR and mass spectra.
Determination of purity of samples and separation of mixtures by column chromatography.

Paper CH (OC) 452P: Synthesis and analysis of drugs :
Synthesis of different types of drugs and their analysis.

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MAHATMA GANDHI UNIVERSITY, NALGONDA

(*Accredited with "B" Grade by NAAC*)

PROGRAMME NAME: M.Sc. INTEGRATED PHARMACEUTICAL CHEMISTRY

PROGRAMME CODE: 608

PROGRAM OUTCOMES OF M.Sc., 5 YEAR INTEGRATED PHARMACEUTCAL CHEMISTRY	
PO-1 : Pharmacy Knowledge	Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioural, social, and administrative pharmacy sciences; and manufacturing practices.
PO-2: Planning Abilities	Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implementplans and organize work to meet deadlines.
PO-3: Modern tool usage	Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
PO-4: Leadership skills	Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities.
PO-5: Communication	Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

MAHATMA GANDHI UNIVERSITY, NALGONDA

(*Accredited with "B" Grade by NAAC*)

PROGRAMSPECIFIC OUTCOMES OF M.Sc., 5 YEAR INTEGRATED PHARMACEUTCAL CHEMISTRY	
PSO-1 : Scientific Knowledge	Execute the team based research to implement innovative solutions in the area of formulation, quality assurance and technology transfer.Enhance the Scientific temper among the students so as to develop a research culture and implementation of the policies to tackle the burning issues at global and local level.
PSO-2: Problem Analysis	Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Develop an ability to undertake multidisciplinary tasks in the pharmaceutical quality system.
PSO-3: Professional Identity	Understand, analyze and communicate the value of their professional roles in society. Set-up apharmaceutical production unit to design and formulate pharmaceutical dosage forms.
PSO-4: Pharmaceutical Ethics	Honour personal values and apply ethical principles in professional and social contexts. Demonstrate the behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
PSO-5: The Pharmacist and Society	Validate the knowledge and skills gained through education to gain recognition in Pharmaceutical society and related field.

COURSE OUTCOMES

SEMESTER-I

1.1 **T : INORGANIC CHEMISTRY :**This course gives theoretical understanding about the basic concepts of matter, atoms, ions and molecules. This also develops a basic quantum chemistry concept. This course gives an idea on periodic classification of elements in the periodic table and changes in properties. This course apprises students about the variety of compounds of the main group elements.

1.2 T :ORGNAIC CHEMSITRY : It describes about the Structure and reactivity of organic compounds.To describe the preparation and applications of hydrocarbons. To discuss the preparation of benzene with their chemical properties. It also Explains the aromaticity and Huckel`s rule of aromatic compounds.

1.3 **T: ANALYTICAL CHEMISTRY :** Explains about the Fundamentals of Chemical Analysis**&**Significance of quantitativeanalysis in quality control. It also gives information on Acid-Base titrations, Oxidation Reduction and complexometric Titrations, Argentometric Titrations & Gravimetric Analysis.

1.4T:BIOLOGY/MATHEMATICS : It describes about the Definition and characters of living organisms, classification of nervous system, Plants and mineral nutrition & Plant respiration. It gives information on Algebra, Triginometry, Geometry& Integrations.

1.5T: ENGLISH : Comprehend various forms of literature like prose, poetry, drama and fiction

1.6T: TELUGU : Prose & poetry in Telugu

1.7P: INORGNAIC CHEMISTRY LAB : Estimation of sodium carbonate and sodium hydrogen carbonate present in a mixture, Estimation of Fe (II) & Estimation of oxalic acid.

1.8P: ORGNAIC CHEMISTRY LAB : Detection of extra elements (N, S, Cl, Br, I) in organic compounds containing up to two Extra elements.

1.9P: PHYSICAL CHEMISTRY LAB : Preparation& Standardization of solutions & Assay of inorganic compounds by Iodometry, Complexometry&Permanganometry.

SEMESTER-II

2.1 T : ORGANIC CHEMISTRY-II : Gives information about the structure and the preparation of Hydroxy compounds &carbohydrate. Study about the chemistry of Aromatic aldehyde, aromatic ketones and acids.Study about the chemistry of amines, Nitro compounds, Cyanides and isocyanides.

2.2T : PHYSICAL CHEMSITRY : To know the concept of solution and its various colligative properties. To understand the concept of phase rule and degree of freedom. Introduction of photochemical reactions and types of adsorption and description about polymers.

2.3 T: ANATOMY &PHYSIOLOGY : Explains the morphology, physiology of skeletal system along with the physiologyof muscle contraction. Gives information about the respiratory, nervous systemand cardiovascular systems.

2.4T: BASICS OF PHARMACEUTICAL SCIENCES : Describes about the scope of Pharmaceutical sciences.Understand the chemistry of drugs with respect to their pharmacological activity , Drug discovery and drugformulations.

2.5T: ENGLISH –II : Write analytically in different formats like essays & usage of grammar etc.,

2.6T: TELUGU-II : Prose& poetry in Telugu & Grammar usage in Telugu language.

2.7P: ORGNAIC CHEMISTRY LAB : Organic preparations and identification of organic compounds and
detection of extra elements.

2.8P: PHYSICAL CHEMISTRY LAB : Determination of Partition co-efficient & CST, preparation and
stability studies of emulsions.

2.9P: ANATOMY &PHYSIOLOGYLAB :`Microscopic study of different tissues, identification of
bones and joints and study of different systems with the help of charts and models.

SEMESTER-III

3.1 T : HETEROCYCLIC CHEMISTRY : The students will develop fundamental theoretical understanding of heterocyclic chemistry.

3.2T : PHYSICAL CHEMISTRY : Recognize the basic concepts of thermodynamics. Able to predict the
reversibleand irreversible reaction. Able to understand the physical significance of third law of thermodynamics. Able to recognize the reaction of electrochemical cells and types. Nano materials advantage, importance in technological applications.

3.3 T: BIOCHEMISTRY : Gives information about the Metabolism of carbohydrates, Amino acids,
Peptides&& Proteins, Fatty Acids, Lipids, Nucleic acids & also covers the nomenclature & Classification of enzymes. To understand the basic principles of protein and polysaccharide

structure.

3.4T: UNIT PROCESS : Knowledge of basic principles of fluid mechanics & Heat transfer Mechanisms. It also covers the Basic Principles and methodology of simple distillation, Applications& mechanism of drying process, mixing and filtration.

3.5T: BASICS OF PHARMACOLOGY : The main purpose of the subject is to understand what drugs
do to the living organisms and how their effects can be applied to therapeutics**.** Drug Action at Receptors, introduction of ADME, drug exposure in living systems.

3.6T: GENDER SENSITIZATION : Definition, Nature and Evolution, Culture, Tradition. Human
Rights and Parity.Domestic Violence & Real Life Experience of Gender Interaction.

3.7P: HETEROCYCLIC CHEMISTRY LAB : Preparation of various heterocyclic compounds.

3.8P: PHYSICAL CHEMISTRY LAB : Determination of first order reaction rate of the hydrolysis &
determination of particle Size & viscosity of liquid.

3.9P: BIOCHEMISTRY LAB : Extraction of starch from Potato and its identification & Qualitative
analysis of sugars, amino acids and lipids.

SEMESTER-IV

4.1 T :INORGANIC PHARMACEUTICAL CHEMISTRY : Well acquainted with the principles of limit tests. Knowledge about the sources of impurities and methods to determine the impurities in
inorganic drugs and pharmaceuticals.

4.2T :PRINCIPLES OF STEREOCHEMISTRY : An exposure about the stereochemistry of molecules and different techniques of asymmetric synthesis. Explains about the Conformational Analysis of cyclic and acyclic systems and also covers Molecular representations, symmetry and chirality.

4.3 T: MICROBIOLOGY : Microbiology and its application in Pharmaceutical sciences, Concepts
of sterilization & immunity.

4.4T: PRINCIPLES OF DRUG DISCOVERY AND DEVELOPMENT : Over view on drug discovery, General classification of pharmacokinetic Properties, Pharmacodynamics and drug discovery &Drug-like Properties.

4.5T: SPECTROSCOPY-I : Principles, instrumentation and applications of different spectra.

4.6T: ENVIRONMENTAL SCIENCES : Types of environmental pollution, Water Analysis and Waste Water Treatment,Solid and Hazardous Waste Management,basic concepts of bio-diversity and biodiversity act &types of nuclear reactions.

4.7P: INORGANIC PHARMACEUTICAL CHEMISTRY LAB : Applications of limit tests, identification tests, test for purity and preparationofInorganic pharmaceuticals.

4.8P: ORGANIC CHEMISTRY LAB : It includes separation of binary mixtures and preparation of organic compounds.

4.9P: MICROBIOLOGY LAB : Sterilization techniques, microbiological media preparation, Turbidometricestimation of bacterial growth & Study of symptoms of viral diseases.

SEMESTER-V

5.1 T :ORGANOMETALLICS (CO-ORDINATION CHEMISTRY) : It peculates the basic knowledge in the principles of electrochemicalanalytical techniques.

5.2T :CHEMISTRY OF NATURAL PRODUCTS : Application of computers in pharmaceutical sciences. Measures of central tendency**&**Pharmaceutical examples.

5.3 T: PHARMACEUTICAL ANALYSIS-I : Separation techniques and demonstration of HPLC & GC.

5.4T: COMPUTERS AND BIOSTATISTICS : Identification of alkaloids by specific colour tests & isolation of natural products.

5.5T: PHARMACOLOGY : Understands the application of basic pharmacological knowledge inthe prevention and treatment of various diseases.

5.6P: CHEMISTRY OF NATURAL PRODUCTS LAB : Calculation of IC50 values and Ki values & Drawing of antibacterial agents using chem sketch programme and visualizing in 3D view.

5.7P: PHARMACEUTICAL ANALYSIS –I LAB : Understand the chromatographic separation and analysis of drugs. Performquantitative & qualitative analysis of drugs using various analytical
instruments.

5.8P: PHARMACOLOGY LAB : Calculation of IC50 values and identification of agonist and antagonistUsing Dose response curves and drawing of antibacterial agents using chem sketch programme.

SEMESTER-VI

6.1 T :MEDICINAL CHEMISTRY-I : Purification methods for synthesized compounds using Column Chromatography. Study of ionization constants of drugs.

6.2T :PHARMACEUTICAL ANALYSIS-II: To Understand the concepts of electrochemical analyses, conductometry, amperometry and electrogravimetryFlourimetry, Thermal, X ray diffractiontechniques.

6.3 T: STRATEGIES IN ORGANIC SYNTHESIS : Gives information about functional group inter conversion, principles of Asymmetric synthesis and methodologies in asymmetric synthesis.

6.4T: PHYSICAL PHARMACY : Know the physical properties of drug molecules and buffers in pharmaceutical and biological systems and concept of viscosity, dissolution and disintegration.

6.5T: PHARMACEUTICAL ADMINISTRATION : Principles of Pharmaceutical Industrial Management, Export & import Trade. To know the various types of insurances.

6.6P: PHARMACEUTICAL ANALYSIS –II LAB : Determination of concentration of ions by Polarography, Estimation of paracetomol using calibration curve method &Nephelometric and Trubidimetricestimations. It peculates the basic knowledge in the principles of electrochemical analytical techniques.

6.7P: PHYSICAL PHARMACY LAB : Demonstrate use of physicochemical properties in evaluation of dosage forms. Know the principles of chemical kinetics & to use them in assigning expiry date
for formulation.

6.8P: MEDICINAL CHEMISTRY-I LAB : Preparation of drugs and intermediates and assay of drugs. Calculation of IC50 values.Drawing structures and reactions using chemdraw.

SEMESTER-VII

7.1 T :SYNTHETIC REAGENTS AND APPLICATIONS : Preparation and application of the following organometallic reagents inorganic synthesis. Protection and de-protection of the functional
groups.

7.2T :SPECTROSCOPY-II : Advanced spectroscopic techniques for the elucidation of structure of
organic compounds.

7.3 T: MEDICINAL CHEMISTRY-II : To know the structural activity relationship of different class of drugs.To understand the chemistry of drugs with respect to their pharmacological activity.

7.4T: NUTRACEUTICALS &COSMETICS : To acquire the skills and knowledge regarding development Nutraeuticals& cosmetic and cosmceutical products and latest market technologies used in the development of these products.

7.5P: SYNTHETIC REAGENTS LAB : Reagents in synthesis of organic compounds.

7.6P: MEDICINAL CHEMISTRY-II LAB : Preparation of drugs/ intermediates

SEMESTER-VIII

8.1 T :GREEN CHEMISTRY : An understanding of the field of green chemistry & understanding of
the 12 principles of green chemistry. This will explore the examples from a wide spectrum of industrial sectors.

8.2T :DRUG DESIGN : ExplainS the various stages of drug discovery & Learn the concept of bioisosterism and drug resistance Describe physicochemical Propertiesand the techniques involved in QSAR& introduction to Bioinformaticsand Cheminformatics.Computational Modeling of Drug.

8.3 T: PHARMACEUTICAL BIOTECHNOLOGY : Acquire knowledge in basic principles of genetic engineering and enzyme Technology Apply the principles of biosensors and protein engineering in
Pharmaceutical Industry Explain the concepts of rDNA technology andits applications.

8.4T: RADIO PHARMACEUTICALS & DIAGNOSTIC AGENTS : Information& applications of Radio pharmaceuticals in medicine & pharmacyand Diagonostic agents.

8.5P: GREEN CHEMISTRY LAB : Information about microwave assisted synthesis, Sono chemistry and photochemical reactions.

8.6P: SPECTROSCOPY LAB : Interpretation of organic compounds by V,IR,^{1}HNMR,^{13}CNMR and mass spectra.

SEMESTER-IX

9.1 T :IPR& RA : It gives The clear information about the patent laws, intellectual property rights and drug regulation in India and abroad is gained by the students. Regulatory Affairs discuss the concept of innovator and generic drugs, drug development process &
discuss the regulatory guidance's and guidelines for filing and approval process.

9.2T :ASPECTS OF CLINICAL TRIALS AND PHARMACOVIGILENCE : Explains the regulatory requirements for conducting clinical trial & describes in detail about the various types of clinical trial designs. It also explains the responsibilities of key players involved in clinical trials.

9.3 T: RESEARCH METHODOLOGY : Illustrate research problem formulation and Analyse the research related information and research ethics.. Demonstrate technical report writing, develop research paper writing skills & develops the Power Point Presentation skills.

9.4T: QUALITY CONTROL OF BULK DRUGS AND FORMULATIONS : Information about the quality control of dosage forms and nutraceuticalsand impurity profiling of harmaceuticals.

9.5P: WEB BASED LEARNING LAB : The e-tutorial is an interactive learning tool covering the foundations of patent documentation, patent search strategies and patent analysis and its numeroususes.

9.6P: QUALITY CONTROL OF BULK DRUGS AND FORMULATIONS LAB :QC tests for tablets and capsules and QC tests for oral liquids and parenterals. Forced degradation studies of some drugs & assay of vitamins.

SEMESTER-X

Project Work (Full semester) : Tounderstand the research problems, execute literature search on a research topic design new experiments to address research problems & conduct experiments in a scientific way & analyze and interpret the results.

MAHATMA GANDHI UNIVERSITY, NALGONDA
(*Accredited with "B" Grade by NAAC*)

PROGRAMME NAME: Ph.D. CHEMISTRY
PROGRAMME CODE: 547

PROGRAM OUTCOMES OF Ph.D IN CHEMISTRY

PO-1 : Building a firm foundation for conceptual, quantitative, and rational thinking that underlies theoriesand models related to the chemical sciences.

PO-2 : Students will be able to integrate chemical concepts and ideas learned in lecture courses with skills learned in laboratories to formulate hypotheses, propose and perform experiments, collect data, compile and interpret results and draw reasonable and logical conclusions.

PO-3: Be proficient in the use of both classical and modern tools (e.g.,instrumentation, techniques, software) for analysis of chemical systems.

PO-4 : Students will be able to identify and solve chemical problems and explore new areas of research.

PO-5 : Students will be explored to interdisciplinary and multidisciplinary areas of chemical sciences and their applications.

PO-6 : Knows the proper procedures and regulations for safe handling and use of chemicals and can follow the Proper procedures and regulations for safe handling when using chemicals.

PO-7 : Students will be empowered with excellent critical thinking skills and problem solving abilities and will be able to communicate the results of their work to chemists and non-chemists.

PO-8: Generate awareness of the benefits and impacts of chemistry related to the environment, society and other disciplines outside the scientific community.

PO-9 : Possess the fundamental knowledge needed to understand and critically evaluate current researchin their chosen subfield of chemistry.

PO-10 : Be proficient in laboratory, theoretical, and/or computational techniques necessary to contribute toknowledge in their chosen subfield of chemistry.

MAHATMA GANDHI UNIVERSITY, NALGONDA
(*Accredited with "B" Grade by NAAC*)

PROGRAM SPECIFIC OUTCOMES OFPh.D IN CHEMISTRY

PSO -1 :To apply the fundamental knowledge of chemistry to seek solutions to complex problems in modern Chemistry.

PSO-2:To integrate and apply relevant knowledge to problems that emerge from the Broader interdisciplinary and multi-disciplinary areas such as life sciences, health & medicines, energy, materials, environmental sciences etc.

PSO-3: To develop skills to design and test hypothesis, execute research experiments, conduct chemical syntheses, analyses or other chemical investigations, compile raw data and provide conclusions.

PSO-4 :Design solutions for complex scientific problems and develop innovative processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PSO-5: Apply ethical principles in research and commit to professional ethics, responsibilities and norms.

PSO-6 :Independently explore new areas of research in both chemistry and allied fields of science and technology.

PSO-7: To inculcate skill in problem solving, critical thinking and scientific problems.

PSO-8: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PSO-9 :Communicate effectively on complex scientific results with the peers and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PSO-10 :To have the preparation and ability to engage in independent and life-long learning in the context of scientific advance.

MAHATMA GANDHI UNIVERSITY, NALGONDA

(*Accredited with "B" Grade by NAAC*)

COURSE OUTCOMES OF Ph.D. IN CHEMISTRY

PAPER-1

UNIT-1 : Understand the concept of symmetry (operation & elements) & molecular point group. Able to classify the molecules based on point group. Able to visualize molecule in 3-D. Gain The knowledgeabout the different types of reaction mechanisms.

UNIT-II : Gives information about the oxidations, reductions & use of organometallic reagents in organic Synthesis & modern organic synthetic reactions.

UNIT-III : To study about the structure activity relationships and linear free energy relationships. To study the applications of various photochemical reactions.

UNIT-IV : To learn the principle and applications of NMR, MASS, IR & UV spectroscopy for the Determination of structure of molecules.

PAPER – II :ORGANIC CHEMISTRY SPECIALIZATION

To understand the basic principles of 13C spectroscopy ad to apply for structural elucidation.And to learn the methods of characterizing compounds by 2D NMR techniques.Structural Elucidation, synthesis and stereochemistry and spectral applications of natural products.Exposure on New techniques and concepts in organic synthesis.Able to account the basicprinciples, Importance & applications of Green Chemistry. Apply microwave and ultrasoundassisted Synthesis in preparing organic compounds. Design of organic synthesis and understanding The current tools of asymmetric synthesis.

PAPER – II :INORGANIC CHEMISTRY SPECIALIZATION

Able to compare the splitting pattern in different types of geometries (Oh, Td, distorted Oh, TBP, Linear etc.,) & calculate crystal field stabilization energy, magnetic behaviour of different complexes. Determination of terms of different configuration .Able to draw Orgeldiagrams of S, P, D, and F terms & Study on Electron Absorption spectroscopy. IR, Raman,NMR and ESR studies of metal complexes.Study of Supramolecules and Organo metallic Catalysis & Catalytic

role of Organometallic Compounds.Acquires knowledge about various elements functions in biological system& Platinum complexes in cancer therapy. Acquire knowledge about variousbiological dioxygen carriers.

PAPER – II :PHYSICAL CHEMISTRY SPECIALIZATION

Broad categories of catalysts includes preparation and characterization of catalysts. Students will learn the basic concept of nanomaterials and preparation methods. Thestudents will have fundamental understanding of gas-solid surface and interface chemistrywhich is a key parameter forheterogeneous catalyzed reaction & also covers theIntroduction to Phase-transfer catalysis.A detailedstudy on polymers & uses of smart materials in Sensing devices and communication networks. Polymers in biomedical applications.Electrode-electrolyte interface &Electrochemical mechanism ofcorrosion. Principle and instrumentation of Polarogaphy Cyclic voltammetry &Electro-Organic synthesis. Preparation and characterization techniques of inorganic solids. Molecular modeling includes of QSAR studies,Docking Algorithms & Docking analysis.

MAHATMA GANDHI UNIVERSITY, NALGONDA
(*Accredited with "B" Grade by NAAC*)

DEPARTMENT OF BIO-CHEMISTRY
PROGRAMME NAME: M.Sc. BIO-CHEMISTRY
PROGRAMME CODE: 514

PROGRAMME OUTCOMES: M.Sc. BIO-CHEMISTRY

PO1: Academic knowledge and understanding of Biochemistry: students study about structures and importance of various biological molecules and their involvement in various biochemical metabolic reactions. By the end of four semesters of M.Sc. Biochemistry, students will gain the depth of scientific knowledge in 'Biochemistry' and its allied areas.

PO2: Critical thinking: Students will be able to demonstrate experiments and with increment in critical thinking they gain problem solving abilities.

PO3: Research and development: Students will have the capacity to think of new ideas for research, analyze them, execute the experiments and report them. They will be able to tackle and solve the problems during their research work.

PO4: Gaining of Basic professional skills: students gain the knowledge pertaining to Biochemical tests, carrying out clinical diagnostic tests and gain the ability to use skills in specific areas related to biochemistry such as Clinical Biochemistry, Microbiology, Health etc.

PO5: Effective Communication and writing skills: Students will develop the ability for articulation of ideas, scientific writing and effective presentation skills. They also develop effective interaction with others through their listening, speaking, and observational skills.

PO6: Social mingling and Competence: They will be able to plan and manage projects in order to achieve objectives and targets. They will also develop the ability to work in a group or community.

PO7: Self-directed and Continuous learning: They will be able to recognize the importance of continuous updating of their knowledge and skills for continuing professional development.

PROGRAMME SPECIFIC OUTCOMES - M.Sc. BIO-CHEMISTRY

PSO1: students obtain the essential knowledge and skills to pursue a career in research, industry and in academic set up.

PSO2: Apply the understanding of experimental approaches to solve problems and will have an ability to implement solution to new problems.

PSO3: students will be able to apply the techniques in Analytical biochemistry, Clinical biochemistry, Microbiology, Molecular biology and Biotechnology, Bioinformatics.

PSO4: understand and evaluate the depth of scientific knowledge in the fields including Cell biology, Metabolism, Bioanalytical techniques, Pharmaceutical Biochemistry, Genetics, Nutritional Biochemistry, clinical biochemistry, Immunology, Molecular biology, Biotechnology, Microbiology and Enzymology.

PSO5: Describe and express the biochemical basis of human diseases, protein structure and conformation, its effect on function, non-invasive diagnostics, biochemical pathways regulation and new drug development, drug metabolism and apply the same for multitude of laboratory applications.

COURSE OUTCOMES – M.Sc. BIOCHEMISTRY

BI 101T: Chemistry and Metabolism of Proteins, Lipids and Porphyrins

CO1: Students can understand the concepts of preparation of buffers, molarity, normality, molality. CO2: Students understand of different types of chemical bonding, molecular machinery of living cells, principles that govern the structures of proteins and lipids and their participation in living system. CO3:To identify with the classification and structural properties, metabolism of proteins, and lipids and their significance in biological systems.

BI 102T: Chemistry Metabolism of Carbohydrates, Nucleic Acids and VitaminsCO1:students will understand about biochemical reactions which occur in the living organisms. **CO2**:By studying this paper students will able to differentiate the anabolic and catabolic pathways and their important enzymatic steps. Students will understand how glycolysis produces metabolic energy as well as producing intermediates for further metabolic reactions. CO3 :students acquire knowledge about how regulation of biochemical pathways leads to normal integrated metabolism, understand the organization of a typical mitochondrion, enzymes, respiratory complexes, how they function to synthesize ATP CO4:To understand the importance of Integration of Metabolism, catabolism, hormonal regulation of metabolism etc will be exposed with the fact that perturbations in the biochemical reactions lead to various diseases. Students understand about various vitamins and their importance, diseases related to their deficiencies.

BI 103T: Bioanalytical Techniques.

CO1: Analytical science is the study of the determination of the chemical composition of natural and artificial materials using instrumental techniques.

CO2: Students will gain theoretical and practical knowledge of experimental methods and analytical instrumentation of chromatography, electrophoresis, centrifugation

CO3 :Students will be able to safely and efficiently select and apply appropriate analytical methods for biochemical materials analysis

BI 104T: Bioenergetics and Cell Biology.

CO1: students have an understanding of laws of thermodynamics, high energy compounds

CO2: structure of prokaryotic cell and its growth

CO3: students gain knowledge of structure of eukaryotic cell, cell cycle and apoptosis

CO4: students gain the knowledge of plant and animal cell culture

BI 201T: Enzymology.

CO1: Students will be prepared for theoretically & practically to understand properties of enzymes.

CO2 :Enzymes are functional and its role in living system is unique. To understand ability to difference between a chemical catalyst and biocatalyst along with concept of enzymes substrate kinetics and its importance in biological reactions.

CO3 : detailed understating of enzymology will help students to prepare their mind for interdisciplinary functional properties of proteins.

CO4 :This paper gives platform to develop vast range of application of industrially valuable enzymes.

CO5:Students will understand the structures and purposes of basic components of cell, especially membranes and organelles.

CO6: Appreciate the cellular components underlying cell division along with a deep insight to cell division, cell death and uncontrolled cell division.

BI 202T: Molecular Biology:.

CO1: students learn the importance of theoretical knowledge of molecular biology to perform laboratory techniques in molecular biology and its allied advanced techniques..

CO2. Develop critical-thinking, and problem based learning skills.

CO3: This paper will open an understanding of current trends in molecular and genetic research, and critically appraise published work. Students will be prepared to demonstrate an ability to design, undertake and interpret, a research project, presented in the form of a dissertation

BI 203T: Biochemical Genetics and Model Organisms

CO1 :Students will learn the basic principles of inheritance and patterns of heredity.

CO2: Students will test and deepen their mastery of genetics by applying this knowledge in a variety of problem-solving situations.

CO3: students will learn about different model organisms and their application in various research studies.

BI 204T: Endocrinology and Metabolic Disorders

CO 1: students will learn about various endocrine glands present in the human system and their importance

CO2: students have an understanding of various secretions produced by different endocrine glands present in the body

CO-3: students have a deep knowledge of hormonal regulation, if it fails then its consequences

CO-4 how endocrine hormones play an importance role in regulation of various metabolic reactions.

BI 301T: Gene Regulation and Genetic Engineering

CO1:students will learn about genes involved in regulation of gene expression in prokaryotes,viruses and eukaryotes.

CO2: students gain knowledge of recombinant DNA technology importance, enzymes involved, various vectors used in this technology

CO-3 students have deeper understanding of various expression systems for the production of various products.

BI 302T: Immunology and Immunotechnology

CO1: To attain a knowledge of the cells and molecules of the immune system.

CO2: Understanding of mechanism of interaction in defending the body against invading microorganisms.

CO3: Students will get knowledge of development and acquisition of ability to recognize antigens and finally how they malfunction in autoimmune diseases.

CO 4: Overview of Immune Response, Innate Immunity,, Cytokines, Effect or Mechanism of Cell Mediated Immunity, Effect or Mechanism of Humoral Immunity

BI 303T: Clinical Biochemistry/ Nutrition

CO 1: students gain the knowledge of theoretical and practical aspects of blood biochemistry and its components.

CO 2: students have an understanding of consequences of environmental and genetic factors of blood disorders.

CO 3: students will study about the diagnosis of common biochemical disorders.

CO4: Distinguish between between fat-soluble vitamins and water-soluble vitamins, biochemical functions and synthesis for these vitamins. Have an understanding of microelements and nutritional disorders

BI 304T: Human Physiology and Xenobiotics:

CO1: This course will provide a sound basis in human physiology to support in-depth understanding of physiological processes of all body systems in detail and on an appropriate level.

CO2: Students will able to explain how the activities of organs are integrated for maximum efficiency.

CO3 : Students will be prepared to identify how changes in normal physiology lead to disease .

CO4: students will understand the role of liver in degrading toxic compounds to non toxic, their by protecting it from various diseases.

BI 401T: Biostatistics and Bioinformatics.

CO1: Students will choose appropriate experimental strategy for research in basic and applied biology.

CO2: Explanation and integration of bioinformatics principles and its applications to basic and applied biology.

CO3: Students will gain in silico training on data mining, database searching, software application, quantitative analysis and interpretation, molecular modeling, and various DNA, RNA and Protein analytical tools.

CO4: Moreover, this paper enables students to acquire the knowledge of statistical analysis and its principles.

BI 402T: Cell-Cell Communication and Signal Transduction

CO1: students will have an understanding of various transporters, signaling systems available in the body

CO2: students understand the importance of cell signaling, signaling molecules

CO3: link can be studied between cell signaling mechanism and cancer

CO4: students gain knowledge about how cell signaling takes place in plants and bacteria

BI 403T: Microbiology

CO 1: Students will be able to appreciate the entire spectrum of microscopic life forms – from viruses to bacteria. Their culturing and staining methods

CO 2: Awareness will be created on different types of viruses and diseases caused by them.

CO3: students have an understanding of prokaryotic viruses and eukaryotic viruses

CO4: Students will get deep insight in to life cycles of various fungi and viruses.

BI 404T: Biotechnology

CO1: Understanding of the microbial cell and appreciate the role of them in production of various components.

CO2: students learn about plant tissues culture and protoplast isolation and culturing, fusion, plant vectors, IPR etc.

CO3: To attain a working knowledge of discrimination between the different types of cell culture technologies.

CO4: Students will gain knowledge in identifying the appropriate cell model for a large scale process. CO 4: Gain knowledge of recent developments in cell and tissue engineering.

PROGRAMME NAME: Ph.D. BIO-CHEMISTRY
PROGRAMME CODE: 547

Programme outcomes: Ph.D. Biochemistry

PO1: Academic knowledge and understanding of Biochemistry: students will gain the depth of scientific knowledge in 'Biochemistry' and its allied areas.

PO2: Critical thinking: Students will be able to demonstrate experiments and with increment in critical thinking they gain problem solving abilities.

PO3: Research and development: Students will have the capacity to think of new ideas for research, analyze them, execute the experiments and report them. They will be able to tackle and solve the problems during their research work.

PO4: Effective Communication and writing skills: Students will develop the ability for articulation of ideas, scientific writing and effective presentation skills. They also develop effective interaction with others through their listening, speaking, and observational skills.

PO5: Social mingling and Competence: They will be able to plan and manage projects in order to achieve objectives and targets. They will also develop the ability to work in a group or community.

PO6: Self-directed and Continuous learning: They will be able to recognize the importance of continuous updating of their knowledge and skills for continuing professional development.

Programme Specific Outcomes- Ph.D. Biochemistry

PSO1: students obtain the essential knowledge and skills to pursue a career in research, industry and in academic set up.

PSO2: Apply the understanding of experimental approaches to solve problems and will have an ability to implement solution to new problems.

PSO3: students will be able to apply the techniques in Environmental science, Analytical biochemistry, Microbiology, Molecular biology, Biotechnology, Biostatistics, Bioinformatics.

PSO4: students will understand and evaluate the depth of scientific knowledge in the fields including Environmental biology, Bioanalytical techniques, Molecular biology, Biotechnology, Microbiology, Enzymology, Biostatistics and Bioinformatics.

PSO5: students will be able to describe and express about protein structure and conformation, biochemical pathways, their regulation and microorganisms isolation, purification, their characterization, their application.

Course Outcomes - Ph.D. Bio-Chemistry

Paper I— I BIOCHEMICAL METHODOLOGY AND METABOLISM

CO1: students learn about light, phase contrast and electron microscopy, different types of chromatography, Electrophoresis, centrifugation. They will gain knowledge about Nucleic acid hybridization, Nucleic acids Blotting techniques, PCR.

CO2: students have an understanding of determination of the structure and conformation of proteins and polypeptides, MALDI TOFF, LCMS/MS. They will be having a deep insight into the Principles, methodology and applications of genetic engineering, chemical synthesis genes. Molecular diagnosis gene therapy.

CO3: students gain academic knowledge about Enzyme kinetics, regulation of enzyme activity, allosteric enzymes, and co factors. Students learn about active sites and mechanism of action of enzymes, Enzyme activators, inhibitors, isoenzymes. Students will learn about Energy metabolism.

CO4:. Students will learn about Carbohydrate Metabolism, Amino acid metabolism, purine and pyrimidine metabolism , Lipid metabolism.

Paper - II : CELL, IMMUNOLOGY AND MOLECULAR BIOLOGY

CO1: students will gain the knowledge of importance of Membranes, receptors, mechanism of action of hormones, signal transduction mechanisms

CO2: students will learn about the significance of the Classification of immunoglobulines, humoral and cell mediated immunity, hypersensitivity, bioinformatics tools

CO3: students have an understanding of DNA replication, DNA damage, repair, Mechanism of transcription and translation in prokaryotes and eukaryotes. Students will learn about RN A and DNA viruses.

CO4: students gain the knowledge of Regulation of gene expression. They will find how Molecular chaperones. Students get dept knowledge of Oncogenes, molecular basis of cancer and Tumor suppresson.

MAHATMA GANDHI UNIVERSITY, NALGONDA
(*Accredited with "B" Grade by NAAC*)

DEPARTMENT OF BIO-TECHNOLOGY
PROGRAMME NAME: M.Sc. BIO-TECHNOLOGY
PROGRAMME CODE: 516

Programme Outcomes in MSc Biotechnology

- PG Graduates of are **Professionally Competent** with characteristic **Knowledge-bank, Skill-set, Mind-set** and **Pragmatic Wisdom** in their chosen fields.

- PG Graduates demonstrate the desired sense of being **Seasoned**and exhibit unequivocal **Spiritedness** with excellent qualities of productive contribution to **society** and **nation** in the arena Science and Technology.

- PG Graduates of are mentored such that they exert **Leadership Latitude** in their chosen fields with **commitment to novelty** and **distinction**.

- PG Graduates are directed in understanding of ethical principles and responsibilities, moral and social values in day-to-day life thereby attaining **Cultural** and **Civilized** personality.

- PG Graduates of are able to **Collate** information from different kinds of sources and gain a coherent understanding of the subject.

Program Specific Outcomes: M.Sc. Biotechnology

PSO1: Apply fundamental knowledge of biological sciences for the human Welfare.

PSO2: Demonstrate the application of biotechnological processes of industrial biochemical processes that are of social and industrial importance.

PSO3: Exhibit skills of handling microbial processes, biochemical analysis by making use of state of the instruments.

PSO4: Acquire skills of handling plants and in vitro culturing and genetic engineering process which are important for addressing biotic and abiotic structure and social issues.

PSO5: Committed for developing a student's self-reliance, creativity, leadership, ethical standards, and capacity for professional and intellectual growth.

PS06: Exhibit strong, independent learning, analytical and problem solving skills with special emphasis on design, communication and an ability to work in teams.

COURSE OUTCOMES – MSc Biotechnology

Semester I

BT 101 - CELL BIOLOGY

CO1 : Describing and discussing about membrane transport. Explaining the nature of polymers and their integrity in cell structure.

CO2 : Describing that external signals are amplified within the cells.

CO3 : Cell communication, Discussing the complexity of cell specialization in everyday life.

CO4: Discussing the phases and importance of cell cycle and cell division.

BT 102 - GENETICS

CO1: Describing in detail about Mendel's laws of genetics, linkage and crossing over, Non-mendelian genetics and clinical relevance.

CO2: Describing a) Translocation. b) Chromosomal packing c) Inversion.

CO3: Describing the genetic analysis in fungi and gene mapping in bacteria and viruses.

CO4: Describing the structure and variation of chromosome, chromosomal abberrations.

BT 101 - BIOCHEMISTRY

CO1: Discussing in detail about structure and functions of carbohydrates. Discussing in detail about primary, secondary and tertiary structure of protein.

CO2: Describing classification of lipids with examples and its functions. State various functions of storage lipids.
CO3: Understanding the concept of chemical bonds/ stability / interactions.
CO4: Explaining biochemical characteristics of amino acids

BT 104 - MICROBIOLOGY
CO1: Narrating the gene transfer methods in microbial system- conjugation, transduction transformation.
CO2 : Explaining the growth & determining growth curve, nutritional needs for microbial growth and growth kinetics.
CO3: Explaining the microbial metabolism and Understanding the culture techniques.
CO4: Explaining the characteristics of Organisms, detailed concept of virology.
BT 105P – CELL BIOLOGY AND GENETICS PRACTICAL -
CO1: The students get trained with different microscopic techniques. Observing and classifying the prokaryotic cells (bacteria) using differential staining.
CO2 : Identifying and describing the process and purposes of the cell cycle, meiosis, and mitosis, as well as predict the outcomes of these processes.
CO3: Transmission genetics problems, make accurate predictions about inheritance of genetic traits, and map the locations of genes, pedigree analysis.
CO4: Karyotyping, Types of banding, culturing Drosophila, identifying polytene chromosomes.

BT 106P - BIOCHEMISTRY AND MICROBIOLOGY PRACTICAL
CO1: Understand the theory of techniques in protein biochemistry. Learning Basic microbial laboratory techniques and its maintenance.
CO2: Students will develop practical and research skills by exploiting the physico-chemical properties of molecules in a variety of experimental techniques, and interpreting the data they generate.
CO3: Understanding Microscopy, learning sterilization techniques, Learning the types of staining and its application in identification of microorganisms.
CO4: Constructing the bacterial growth curve. Learning various microorganism culturing techniques.
BT 107: ADD ON PAPER – COMMUNICATIVE ENGLISH & SOFT SKILLS
CO1: Learning Oral and Aural Skills.
CO2 : Students will gain knowledge and skills on how to write.
CO3: Job applying skills.
CO4: Learn soft skills.

BT 108: SEMINAR
CO1 : students will learn to prepare and present seminar papers and project reports effectively.
CO2 : Writing assignment and taking seminar improves the student's communication skill.

CO3 : Students can able to gain knowledge on scientific research and types of research.
CO4: Students have opportunity to address problems in biotechnological related practices usually caused by a lack of biodiversity in microbial communities.

Semester II

BT 201 - MOLECULAR BIOLOGY

CO1: This course provides basic knowledge in understanding genome organization and control of gene expressions in prokaryotic, eukaryotic genetic system. Explaining the chemical and molecular processes that occur in and between cells.
CO2: Students will learn the process of transcription, translation, identifying genetic code, understanding Operon Concept.
CO3 : Discussing in detail about the various experiments which lead to the identification of DNA as genetic material.
CO4: With this course the gene concept, gene structure, DNA replication, repair and genetic recombination is made clear.

BT 202 - RECOMBINANT DNA TECHNOLOGY

CO1 : This course Explains Restriction endonucleases –Type I, II & III and DNA Manipulative Enzymes. Gives Details of Cloning vectors and their applications
CO2 : Describes Expression vectors for Prokaryotes & Eukaryotes, Gene fusion vectors and Artificial chromosomes.
CO3 : Discuss the Construction of genomic and cDNA libraries and screening methods, Explains blotting techniques and DNA fingerprinting, foot printing, zoo blot, chromosome jumping and chromosome walking.
CO4: Narrate the technique of PCR and its Principle, Types and Applications, Explains DNA sequencing technique and its types of enzymatic and chemical methods, Describe the Site-directed mutagenesis method.

BT 203 - IMMUNOLOGY

CO1 : Understand the concept of Immune system, Immunity, Immune response. Explain the cross reactivity and crosslinking - correlate with antigen-antibody interaction.
CO2 : Disucss-MHC and peptide interaction, explaining its Processing of antigen by endogenous/ exogenous pathway.
CO3 : Discuss the cellular/molecular pathways of humoral/cell-mediated adaptive responses
CO4: understanding of basic mechanisms into identification of biological, clinical and therapeutic implications

BT 204 - BIOSTATISTICS AND BIOANALYTICAL TECHNIQUES

CO1: Knowledge about Statistical analysis- probability and sampling distribution, tests of significance, analysis of variance, multivariate statistics.

CO2 : Finding variance and standard deviation of discrete and continuous frequency distributions, Stating the characteristics of the binomial, poisson and Normal distribution. Calculate all the terms of ANOVA table.
CO3: Spectroscopic techniques: Principle of calorimeter, UV visible spectrophotometer and applications. Electrophoretic techniques: Principle, types, factors affecting electrophoresis (SDS page, 2D gel electrophoresis).
CO4: Affinity chromatography (GC & HPLC)-principle, technique and application. Radioisotopes and its application in biomedical research.

BT 205 - MOLECULAR BIOLOGY AND RDNA TECHNOLOGY PRACTICAL:
CO1 : Students will gain laboratory skills in micropippetting, electrophoresis, etc., Helpful to get hands on experience in purification of molecules like DNA from bacteria, plants, blood etc.,
CO2 : Separation of DNA /RNA. Quantification of DNA/RNA by Spectrophotometric Method.
CO3 : Knowledge on DNA, Plasmid and cloning techniques and its medical/industrial applications. Transformation - $Cacl_2$Method.
CO4: To learn how to Interpret the outcome of experiments that involve the use of recombinant DNA technology and other common gene analysis technique.

BT 206 - IMMUNOLOGY AND BIOANALYTICAL TECHNIQUES PRACTICAL:
CO1 : Trained hands on to analyze the blood groups and Rh factor in human .
CO2 : Skilled with Immuno-electrophoresis, Immunodiffusion, Immuno-precipitation and latex agglutination techniques.
CO3 : Isolation, extraction and separation of samples from various sources, Isolation and separation of proteins ,Learning Chromatography General principle, types and applications of paper, TLC, ion exchange chromatography.
CO4: Students gains a basic working knowledge of SDS PAGE, WESTERN BLOTTING techniques.

BT 207: ADD ON PAPER – HUMAN VALUES AND PROFESSIONAL ETHICS
CO1: Definitional aspects, relevance of ethics in society, scope of ethics.
CO2: Philosophical basis of ethics.
CO3: Learning about ethics in public affairs.
CO4: Learning in detail about Ethics in Profession.

BT 208: SEMINAR
CO1 : students will learn to prepare and present seminar papers and project reports effectively.
CO2 : Writing assignment and taking seminar improves the student's communication skill.
CO3 : Students can able to gain knowledge on scientific research and types of research.
CO4: Students have opportunity to address problems in biotechnological related practices usually caused by a lack of biodiversity in microbial communities.

Semester III

BT 301 - BIOINFORMATICS

CO1: Bioinformatics database, Carry out sequence alignment - pair wise and multiple sequences, local, global and dynamic programming

CO2 : Learning PAM, BLOSUM matrices, Constructing and analyse phylogeny tree using various methods

CO3: Students gains a basic working knowledge Drug Designing, Microarray technology, structural biology

CO4: Learning genomic and proteomic applications of Bioinformatics

BT 302 - BIOPROCESS TECHNOLOGY

CO1 : Students will know about fundamentals of Bioprocess Engineering.

CO2 : Discussing Upstream process, downstream process and product recovery.

CO3 : Discuss about fermentation media, Discuss fermenter design and operation.

CO4: Bioprocess control measurement and automation.

BT 303 - PLANT BIOTECHNOLOGY

CO1 : Discuss about Clonal propagation of plants.

CO2 : Students will gain knowledge on Production of commercially useful compounds by cell cultures.

CO3 : Students will learn the Molecular mechanisms of abiotic and biotic stress tolerance in crop plants

CO4: Discuss Molecular markers and crop improvement.

BT 304 - ANIMAL BIOTECHNOLOGY

CO1 : Explaining Animal tissue culture, tissue engineering and regeneration ,Discuss about embryonic stem cell differentiation.

CO2 : Animal improvement by breeding techniques, Marker assisted selection and genetic improvement of live stocks.

CO3 : Discuss about transgenic animals its development and use .

CO4: Vaccines and therapeutic agents , Apply biotechnology to better understand gene function and generate novel products

BT 305: BIOINFORMATICS AND BIOPROCESS TECHNOLOGY PRACTICAL

CO1 : Search the literature data of the given protein using PubMed, Search the nucleotide sequence data of the given species using NCBI / EMBL / DDBJ, Search the protein sequence of the species using PIR and Swissprot / UniProt, Find the structure of protein using PDB.

CO2 : Mention in detail about functional prediction of hypothetical proteins using combined bioinformatics approaches.

CO3 : Perform the pairwise alignment of the given proteins using Dotplot / EMBOSS water /EMBOSS Needleman, Carry out the multiple sequence alignment of the proteins with Clustal OMEGA.

CO4: Selection and screening of industrially significant microbes, Learn the handling knowldge of bioreactors.
CO5: Understand and perform various chromatographic separation techniques namely gel exclusion, ion exchange and inorganic adsorption chromatography.

BT 306: PLANT BIOTECHNOLOGY AND ANIMAL BIOTECHNOLOGY PRACTICAL
CO1: Students will learn MS medium preparation and sterilization, Micropropagation ,Callus induction and Cell suspension culture,
CO2: Agrobacterium mediated genetic transformation.
CO3: Basic knowledge on aseptic culture protocols in animal cell culture, Usage of instruments/ tools in animal cell culture.
CO4: Mounting of Chick embryo – 24,33,48,72, & 96 Hours.

BT 307: INTERDISCIPLINARY PAPER- CONCEPTS OF BIOTECHNOLOGY.
CO1: Learning the concept and understanding Cell Biology.
CO2 : Learning the concept and understanding Microbiology and Immunology.
CO3: Learning the concept and understanding Genetics and Molecular Biology.
CO4: Learning the concept and understanding Bioinformatics.

BT 308: SEMINAR
CO1 : students will learn to prepare and present seminar papers and project reports effectively.
CO2 : Writing assignment and taking seminar improves the student's communication skill.
CO3 : Students can able to gain knowledge on scientific research and types of research.
CO4: Students have opportunity to address problems in biotechnological related practices usually caused by a lack of biodiversity in microbial communities.

Semester IV

BT 401 - INDUSTRIAL BIOTECHNOLOGY
CO1: Knowing in detail about Bioprocess & fermentation technology, Learning the methods of Isolation, selection and preservation of industrial microorganisms
CO2: Given the knowledge on Concept, Principle, Treatment of Industrial Waste and Present Status of Waste Treatment, Importance's of Hazardous; Chemical, Physical and Biological Hazardous. Occupational Diseases.
CO3: Downstream process and product recovery.
CO4: Production of microbial products.

BT 402 - ENVIRONMENTALBIOTECHNOLOGY
CO1 : :Biomass and bio-fuels, Learning the production of Biofertilizers and biopesticides. Bioremediation and bio-leaching, Genetic engineering in environmental biotechnology.

CO2 : Understanding the effect and Control Measures of air Pollution, Water Pollution, Soil Pollution and Noise Pollution, Water Quality Parameters- Physical, Chemical and Biological.
CO3 : Getting the knowledge on Degradation and Environmental Protection Techniques; Principle and Practise in Composting- Bacterial Composting, Vermi-composting, Cyanobacterial Degradation.
CO4: Students will obtain knowledge on eco-friendly bioproducts from renewable sources the ways to overcome environmental burdens and limitations of environmental biotechnologies used for decontamination of environmental pollutants. Bioremediation and bio-leaching.

BT 403 - INTELLUCTUAL PROPERTY RIGHTS, ETHICS & BIOSAFETY
CO1 : Importance of IPRs in the fields of science and technology, Patents – Concepts and principles of patenting .
CO2 : Knowing bioethics concepts in animal, plant and modern biotechnology .
CO3 : Learning Quality management Procedures
CO4: Explaining about biosafety principles and procedures.
BT 404 - ELECTIVE- MEDICAL BIOTECHNOLOGY
CO1 : Learning the concept, etiology and epidemology of infections, Medical Diagnostic procedures and principles.
CO2 : Description about Tissue Engineering in various Biomedical application.
CO3 : Enable to understand the Bio-medical applications of radiation and general biological systems.
CO4: Elaborates gene therapy and its applications. Knowing about gene products in medicine.
BT 404 – ELECTIVE –NANO BIOTECHNOLOGY
CO1 : Learning the concept and basics of bionanotechnology
CO2 : – Potential based sensors; electrochemical sensors; acoustic/mechanical sensors; thermal and phase transition sensors; sensors in modern medicine
CO3 : Nanomedicine and novel drug delivery systems
CO4: io-Barcode, Nanotechnology in agriculture – Fertilizer and pesticide, Designer proteins, Peptide nucleic acids

BT 405: INDUSTRIAL BIOTECHNOLOGY AND ENVIRONMENTALBIOTECHNOLOGY PRACTICAL, MEDICAL/ NANOTECHNOLOGY PRACTICAL
CO1 : Exploring the microbes from air, solid and liquid samples. And its application in quality improvement, To learn the screening, immobilization and purification of industrially important enzymes.
CO2 : Determination of COD & BOD, Determination of Thermal death point.
CO3 : Explains the procedure of specimen collection, processing and preservation in clinical laboratory. Note on anti-coagulants.

CO4: Exploring the application of nanotechnology in Life Sciences, Differentiate the types of nano particles, synthesis and mechanism, To analyze the Physical and chemical properties of nano particles.

BT 406: M.SC. PROJECT WORK
CO1 : learning the theoretical basis of knowledge in specific subject, Identify various sources of information for literature review and data collection.
CO2 : Explain the methods to analyze, evaluate, select and integrate the sources of data, Determine the ethical value of research and scientific pursuit.
CO3 : Explaining the research requirements in different aspects.
CO4: On completion of the course students will be expected to demonstrate: skills in describing, analysing and interpreting statistical data.

BT 407: INTERDISCIPLINARY PAPER – APPLICATIONS OF BIOTECHNOLOGY
CO1 : Learning the concept and understanding Recombinant DNA technology.
CO2 : Learning the concept and understanding Plant Biotechnology.
CO3 : Learning the concept and understanding Animal Biotechnology.
CO4: Learning the concept and understanding Industrial Biotechnology.

BT 408: SEMINAR
CO1 : students will learn to prepare and present seminar papers and project reports effectively.
CO2 : Writing assignment and taking seminar improves the student's communication skill.
CO3 : Students can able to gain knowledge on scientific research and types of research.
CO4: Students have opportunity to address problems in biotechnological related practices usually caused by a lack of biodiversity in microbial communities.

PROGRAMME NAME: Ph.D. BIO-TECHNOLOGY
PROGRAMME CODE: 819

Programme Outcomes – Ph.D. Biotechnology

- PhD Graduates are well equipped with Research & Development Competences expressive of their Creative Knowledge, Inventive Skill, Resolute Attitude and Innovative Pursuits in their chosen fields.
- PhD Graduates Collate information from a variety of sources and Enrich a coherent understanding of the subject concerned pertaining to Novel investigation on the problems in everyday life.

Programme Specific Outcomes – Ph.D. Bio-Technology

PS01: Apply knowledge of Mathematics, Science and Engineering concepts for Biological issues.

PS02: Plan and execute experiments independently

PS03: Optimize, scale up and analyst the quality of value-added products

PS04: Analyze and interpret data from biological sampling using Insilco Approaches.

PSO4: Apply biotechnological techniques to manipulate living organisms.

PSO5: Give Reasoning to solve social, health, safety and legal issues.

PS06: Understand the potentials, and impact of biotechnological solutions on Environment and society.

PS07: Understand the regulatory norms and ethics in BT product/processes development.

PS08: Acquire contemporary knowledge in BT and will have the ability to engage in lifelong learning.

Course Outcomes – Ph.D. Bio-technology

CO1 -Research Methodology

Describe about research methods, Elaborate the principles of Bioinstrumentation, Describe the principles and methodology of analytical techniques, Discuss about molecular techniques, Gives detail account on Biostatistics, Describes about data interpretation, Explain the principles of bio analytical techniques ,Discuss the concept of standard error and its uses.

CO2–Advancesin Genetic Engineering/Nano technology for Biological applications /Molecular Biology .Understand the Tools of Recombinant DNA Technology Understand the applications of GMOs. Synthesise nanoparticles and Apply nano particles in biotechnology field. Explain the role of nanotechnology in diagnosis and drug delivery increase production by biotechnology tools

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(*Accredited with "B" Grade by NAAC*)

DEPARTMENT OF PHYSICS
PROGRAMME NAME: M.Sc. PHYSICS
PROGRAMME CODE: 509

PROGRAM OUTCOMES:

The Master of Science in Physics program provides the candidate with knowledge, general competence, and analytical skills on an advanced level, needed in industry, consultancy, education, and research.

On completion of program, the post graduates will

PO 1 Apply the knowledge and skill in the design and development of Electronics circuits to fulfill the needs of Electronic Industry.

PO 2 Become professionally trained in the area of electronics, optical communication. nonlinear circuits, materials characterization and lasers.

PO 3 Pursue research related to Physics and Materials characterization.

PO 4 Demonstrate highest standards of Actuarial ethical conduct and Professional Actuarial behavior, critical, interpersonal and communication skills as well as a commitment to life-long learning.

PO 5 Have knowledge and experience in different techniques of optical spectroscopy including the instrumentations and interpretation of the spectra in IR, Raman, Electronic Absorption and Fluorescence spectroscopy.

PO 6 learn various techniques of radio wave propagation, antenna, ICs and various types of communication systems including Television broadcasting & noise analysis

PO 7 Have advanced ideas and techniques required in frontier areas of Physics, and develop human resource with specialization in theoretical and experimental techniques required for career in academia and industry.

PO 8 Demonstrate the generation of electricity from various Non-Conventional sources of energy, have a working knowledge on types of fuel cells.

PO 9 Estimate the solar energy, Utilization of it, Principles involved in solar energy collection and conversion of it to electricity generation.

PO 10 Explore the concepts involved in wind energy conversion system by studying its components, types and performance.

PO 11 Illustrate ocean energy and explain the operational methods of their utilization.

PO 12 Acquire the knowledge on geothermal energy.

PROGRAMME SPECIFIC OUTCOME (PSO)

PSO1 Understand and apply basic principles of physics, and basic interaction laws that govern our universe

PSO 2 Understanding the basic concepts of physics particularly concepts in classical mechanics, quantum mechanics, electrodynamics and electronics to appreciate how diverse phenomena observed in nature follow from a small set of fundamental laws.

PSO 2 Learn to carry out experiments in basic as well as certain advanced areas of physics such as nuclear physics, electronics and lasers.

PSO 3 A research oriented learning that develops analytical and integrative problem-solving approaches.

PSO 4 Understand the nature of a nucleus, nuclear reaction mechanism, nuclear models and its usefulness in power generation and for medical sciences.

PSO 5 Understand and acquire basic knowledge in various techniques in optical spectroscopy and interpretation of spectra.

PSO 6 Learn about the non conventional energy resources which are abundantly available in the nature like solar energy, wind energy etc…

COURSE OUTCOMES

SEMESTER I

COURSE TITLE: MATHEMATICAL PHYSICS&NUMERICAL METHODS (PHY101T)

On successful completion of course student will be able to

CO1. Solve differential equations like Legendre, Bessel and Hermite and their recurrence relations that are common in physical sciences and get introduced to Special functions like Gamma function, Beta function,

CO2. Learn the fundamentals and applications of Fourier series, Fourier and Laplace transforms, their inverse transforms etc

CO3. Calculate numerical derivatives and integrals solve simultaneous linear and non-linear equations numerically, solve ordinary differential equation numerically and fit linear and non-linear models to data.

CO 4. Ability to solve algebraic equations using back substitution, gauss elimination and gauss seidel method

CO5 learn about root fining methods like bi section, Newton raphson and secant approximation methods.

COURSE TITLE: CLASSICAL MECHANICS (PHY102T)

CO1.Students are able to learn the concepts of inertial frames and Galilean transforms and Minkowski space,

CO2.Students are able to learn the concepts of Lagrangian and Hamiltonian mechanics and use them to solve problems in mechanics.

CO3. Obtain knowledge on Euler's equations of motion for a rigid body.

CO4.Able to learn concepts of generating functions, Poisson brackets Hamilton Jacobi equations and action angle variables.

CO5.To acquaints the students about the theory of small oscillations and Euler's equations of motions of rigid bodies.

CO6. To analysis of the free vibrations of a linear tri-atomic molecule, frequencies and normal coordinates.

CO7.To analyze nonlinear dynamical systems and to explain the concepts of classical chaos.

COURSE TITLE: SOLID STATE PHYSICS (PHY103 T)

CO1. Gain knowledge of crystal systems and spatial symmetries, be able to account for how crystalline materials are studied using diffraction, including concepts like reciprocal lattice and Brillouin zones.

CO2. Gain knowledge on Classical free electron theory of metals and Distinction between metals, Semiconductors and Insulators.

CO3. To know Bloch theorem and what energy bands are and know the fundamental principles of semiconductors

CO4.Obtain knowledge on how the semi conductor interacts with light and recombination processes.

CO5. Gain knowledge on thin films and their characterization techniques.

CO6. Obtain basic idea about all types of crystal defects and dislocations.

CO7. Obtain knowledge on elastic waves in one dimensional array of identical atomsand heat capacity of solids

COURSE TITLE: ELECTRONIC DEVICES AND CIRCUITS (PHY 104T)

On successful completion of course student will learn about:

CO1.Basic principles of diodes, Field Effect Transistors, SCR, UJT their principles and applications

CO2 Ability to design regulated power supplies, Amplifiers and Oscillators

CO3 Basic operational amplifier characteristics, OPAMP parameters, applications as inverter, integrator, differentiator etc

CO4 Ability to design filters such as low pass, high pass and band pass. Analyze timer circuits using IC 555, IC 565

COURSE TITLE: COMPUTER PROGRAMMING LAB (PHY106P)

CO1. Learn about basic knowledge of C-Language

CO2. Gaining the knowledge in MATLAB used in real life to innovate robots or human-like machines.

CO3. Gaining the knowledge to design and tune algorithms, real world model systems, and generate code successfully

SEMESTER II

COURSE TITLE: QUANTUM MECHANICS I (PHY201T)

On successful completion of course student will be able to:

CO1. Understand and explain the differences between classical and quantum mechanics

CO 2. Learn operator formalism for observables and basic commutation relations.

CO3. Solve Schrödinger equation for simple potentials like linear Harmonic oscillator and Hydrogen atoms.

CO4. Evaluate the eigen values of L and J vectors.

CO5. Evaluate CG coefficients for different values of total angular momentum vector.

COURSE TITLE: STATISTICAL MECHANICS (PHY 202T)

On successful completion of course student will be able to:

CO1.Explain statistical physics and thermodynamics as logical consequences of the postulates of statistical mechanics.

CO2.To learn the fundamental differences between classical and quantum statistics and learn about quantum statistical distribution laws.

CO3. Obtain knowledge on partition function, translational, rotational and vibrational partition

CO4. Obtain knowledge on Ideal Bose-Einstein gas, Two Fluid model-Phonons, Protons and super fluidity

CO5. Study important examples of ideal Bose systems and Fermi systems.

CO6. Obtain knowledge on Classification of phase transition and-One dimensional Ising model systems.

COURSE TITLE: ELECTROMAGNETIC THEORY (PHY 203T)

On successful completion of course student will be able to:

1. Acquire knowledge on general wave equation using Maxwell's equations and able to derive Laplace equations for electrostatic potential in Cartesian, spherical and cylindrical coordinate

2. Analyze scalar and vector magnetic potentials and the propagation of EM waves in different media

3. Understand the propagation of EM waves in bounded and unbounded media & Boundary conditions for EDB and H.

4. Understand pointing theorem and its physical significance.

5. Analyze Fresnel relations- Reflection (R) and Transmission (T) coefficients. Brewster's angle.

6. Have an idea on the concept of EM radiation of Inhomogeneous wave equation, harmonically oscillating source.

COURSE TITLE: DIGITAL ELECTRONICS & MICROPROCESSORS (PHY 204T)

On successful completion of course student will:

CO1 Explain the basic logic operations of NOT, AND, OR, NAND, NOR, and XOR. 4. Apply the laws of Boolean algebra and K-map to simplify circuits and Boolean algebra

CO2 Understand the working of latches, flip-flops, designing registers, counters, A/D and D/A converters.

CO3 Analyze the operation of decoders, encoders AND multiplexers

CO4 Design and Analyze synchronous and asynchronous sequential circuits.

CO5 Interpret the architecture, instruction set and also practice the basic programs of 8085 microprocessor.

COURSE TITLE: ELECTRONICS LAB (PHY 206P)

CO1. Developing the skills in designing the electronic circuits like amplifiers, oscillators and voltage regulators etc…….

CO2. Understanding the measurements by observing wave form characteristics of like current, voltage, power etc……

CO3. Gaining the knowledge in real life applications of electronic circuits in appliances like audio, video, washing machine, fridge, air condition etc….

SEMESTER III

COURSE TITLE: NUCLEAR PHYSICS (PHY 301T)

On successful completion of course student will:

CO1. Understanding the theory behind nuclear force, deuteron problem and its contribution to the definition of the nuclear force and nuclear models.

CO2. Understanding the structure of nuclei through nuclear models.

CO3. Understanding the nuclear decay processes, multipole radiation and selection rules.

CO4. Understanding the theory behind nuclear experimental technologies to identify particles and their specifications.

CO5. Understanding the interaction of charged particles with matter and working of detectors.

CO6. Understanding nuclear reaction dynamics, its mechanism and classification of elementary particles

CO7. Understanding the applications of nuclear techniques in various fields.

COURSE TITLE: QUANTUM MECHANICS II (PHY 302T)

On successful completion of course student will be able to:

CO1 Understand the kinematics of scattering process.

CO2 Evaluate the partial wave analysis using Born approximation method.

CO3 Apply time Independent perturbation theory for non degenerate case.

CO4 Gain knowledge on WKB approximation method to study alpha decay.

CO5 Remember time dependent perturbation theory

CO6 Analyze the interaction of an atom with electromagnetic radiation and the relativistic quantum mechanics using Klein Gordon equation

CO7 Explore the properties of gamma matrices.

COURSE TITLE: MICROWAVES DEVICES & ANTENNA SYSTEMS (PHY 303T/EC)

CO1. Understanding the microwaves and microwave transmission lines

CO2. Gaining the knowledge of microwave coaxial connectors

CO3. Learns about microwave wave guides and understanding the field patterns

CO4.Learns about the microwave components and understanding wave guide Tees

CO5. Gaining the knowledge of microwave sources

CO6. Understanding the antennas and wave propagation

CO7. Gain the knowledge of internet technologies

COURSE TITLE: ANALOG & DIGITAL TRANSMISSION TECHNIQUES AND INFORMATION THEORY (PHY 304T/EC)

CO1. Understanding the nature of analog and digital signals in the universe

CO2. Understanding the analog and digital signal transmission techniques at transmitter and receivers in the information communication system

CO3. Gaining the knowledge in modulation and Demodulation techniques of analog and digital signals

CO4. Understanding about the amount of information transmission through different coding in communication system

CO5. Gaining the knowledge in analog signal transmission, digital signal transmission, Information transmission through different coding systems in communication

COURSE TITLE: PHOTOVOLTAICS (PHY 303T/NCEP)

CO1. Understand of renewable and non-renewable sources of energy and get the knowledge how the present global needs fulfill by of renewable energy resources.

CO2. Obtain a basic understanding of how to measure solar radiation and calculate salient radiation properties and recombination process.

CO3. Obtain a basic understanding of junction diodes working and solar cell preparation and characterization and output parameters.

CO4. Conceptual awareness of the technology for preparation of solar cell, design and fabrication.

CO5. Obtain the knowledge, which factor affecting on battery performance and storage capacity.

CO6. Obtain knowledge on design of photovoltaic - powered dc fan without battery and design of photovoltaic powered dc pump.

CO7.To obtain the develop understanding on the PV plant design and select suitable technologies.

COURSE TITLE: HYDROGEN ENERGY (PHY 304T/NCEP)

CO1. Understanding the Hydrogen present in the universe

CO2. Understanding the properties and states of hydrogen

CO3. Gaining the knowledge in producing, in storage and in transporting the Hydrogen

CO4. Understanding about working principle of fuel cell

CO5. Gaining the knowledge in application of hydrogen

COURSE TITLE: MODERN PHYSICS LAB (PHY 305P)

CO1. Study the working performance of G-M counter

CO2. Verifying the inverse square law

CO3. Learns about alpha, beta and gamma sources

CO4. Learns about the range of radiation in different media

CO5. Learns about absorption of radiation by matter

CO6. Understanding the energy gap of a semiconductor and its variation with temperature

CO7. Studying the performance of solar cell

COURSE TITLE: ELECTRONIC COMMUNICATION LAB -1 (PHY 306P/EC)

CO1. Understanding the modulation and demodulation circuit design techniques of analog and digital signals at transmitter and receivers in communication system
CO2. Gaining the knowledge in applications of analog and digital signal transmission in communication system

COURSE TITLE: NON CONVENTIONAL ENERGY PHYSICS – I (PHY 306P/NCEP)

CO1. Demonstrate the generation of electricity from various Non-Conventional sources of energy, have a working knowledge on types of PV-cells.

CO2. Estimate the solar energy, Principles involved in solar energy collection and conversion of it to electricity generation.

CO3. Obtain knowledge how calculate the efficiency of the solar cell.

CO4. Obtain knowledge estimation of of Solar Radiation by using Pyranometer.

SEMESTER IV

COURSE TITLE: MODERN OPTICS & SPECTROSCOPY (PHY 401T)

On successful completion of course student will be able to:

CO1. Gain knowledge on basics of laser and laser rate equations for Two, Three, Four-level laser systems.

CO2. Understand Einstein relations for emission and absorption of radiation

CO3. Gain knowledge on classification of laser systems

CO4. Gain knowledge on application of various laser systems

CO 5. Understand basic principles of holography and its applications

CO6. Understand the concept of recording and reconstruction of a hologram

CO7. Understand the Fourier transforming properties of lenses

CO 8. Understand the applications of non-linear optics.

CO9. Understand the basic principles of atomic absorption spectroscopy.

CO10. Interpret the working principles and outline the atomic absorption spectroscopy device.

COURSE TITLE: PHYSICS OF PHONONS & NANOMATERIALS (PHY 402T)

On succcessful completion of course student will:

CO1. To know what phonons are, and be able to perform estimates of their dispersive and thermal properties-solid state diffusion.

CO2. Obtain knowledge on Occurrence of superconductivity and experimental observations.

CO3. Able to explain superconductivity using BCS theory.

CO4 Obtain knowledge on about the background on Nanoscience and their classifications

CO5. Understand the synthesis of nanomaterials and their application and the impact of nanomaterials on environment.

CO6. Explain fundamental ideas of size effect in materials science and propose new applications of nanoscience and nanotechnology.

COURSE TITLE: OPTICAL FIBER COMMUNICATION (PHY 403T/EC)

CO1. Understanding ray transmission theory in optical fiber

CO2. Understanding the preparation techniques and optical properties of optical fiber

CO3. Gaining the knowledge in preparing optical fiber materials and wave guide transmission through optical fiber

CO4. Understanding the stability of signal transmission characteristics in optical fiber

CO5. Gaining the knowledge in applications of optical fibers in communication systems

COURSE TITLE: SATELLITE & MOBILE COMMUNICATION (PHY 404T/EC)

CO1. Understanding the earth station working in the satellite communication

CO2. Learns about working and planning mobile cellular communication systems

CO3. Learns about analog and digital cellular systems

CO4.Understanding the mode of communication with satellites

CO5.Gaining the knowledge in applications of satellites and mobiles in

Communications

COURSE TITLE: SOLAR THERMAL ENERGY (PHY 403T/NCEP)

CO1: To obtain the fundamentals of heat transfer mechanisms in fluids and solids and their applications in various heat transfer systems.

CO2. Gain knowledge about working principle of various solar energy systems.

CO3: Obtain knowledge on energy savings like solar utilizes lower powered items such as LED /CFL lamps, lower powered systems.

CO4. Obtain the knowledge to reduce convective and radiative heat losses from the absorber plate.

CO5. Obtain the knowledge on Solar thermal systems are relatively low maintenance because they use simpler technologies and passive systems that have no moving parts.

CO6. Obtain the knowledge on make interpretation about the solar energy, Construction of the solar energy power plants and solar energy collectors.

CO7. Obtain the knowledge on how solar energy utilized for solar refrigeration - air conditioning systems.

CO8. Obtain the knowledge on solar water heating, solar cooker and solar drying methods.

COURSE TITLE: ENERGY CONVERSION SYSTEMS (PHY 404T/NCEP)

CO1. Understanding the conversion of one form of energy into other form

CO2. Obtains the knowledge in the energy present in the form of wind, Geo thermal , Bio mass and ocean energy...ect

CO3. Gaining the knowledge about design and construction of conversion devices like wind mill, bio gas digesters....ect

CO4. Gains the knowledge about selection of sight to construct the power plant

CO5. Learns about the connection of power generated at the plant to the grid

CO6. Gains the knowledge about getting of electrical energy from non conventional energy sources

COURSE TITLE: ELECTRONIC COMMUNICATION LAB –II (PHY 406P/EC)

CO1. Understanding the microwave characteristics, E-plane, H-plane, magic-Tee and transmission properties of optical fiber.
CO2. Gaining the knowledge in microwave applications and applications of optical fiber sources in transmission.

COURSE TITLE: NON CONVENTIONAL ENERGY PHYSICS – II (PHY 406P/NCEP)

CO1.Explore the concepts involved in wind energy conversion system by studying its components, types and performance.

C02. Study on generation of electricity by using 120Wp solar panel with direct sun radiation and its performance.

CO3. Obtain knowledge on production of hydrogen fuel cell and its applications.

CO4. Obtain knowledge on functioning of solar-cooker and its parameters.

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DEPARTMENT OF GEOLOGY

PROGRAMME NAME: M.Sc. GEOLOGY

PROGRAMME CODE: 522

Program Outcome of M.Sc. (Geology)

- Development of critical thinking to carry out scientific investigationobjectivelywithout beingbiased withpreconceivednotions.
- The students trained to analyze problems, formulate a hypothesis,evaluate and validate results, and draw reasonable conclusions
- Promotestudentsforpursuingresearchorcareersinindustryinearthsciencesandalliedfields
- Development of effective scientific and/or technical communication inbothoralandwriting
- Encouragetoacquirerelevantknowledgeandskillsappropriatetoprofessionalactivitiesanddemonstratehigheststandardsofethicalissuesingeological sciences
- Getting knowledge through systematic studies of different geomorphological process which are operated on the earth surface and construct the palaeoenvironment
- Get the aware on disaster management and rainwater harvesting
- Ability to build up palaeoenvironment and palaeogeological history of the earth
- Achieving knowledge of certain interdisciplinary subjects to correlated the knowledge of geology to other disciplines
- Obtaining knowledge of remote sensing and their applications
- Getting the knowledge of mineral exploration, exploration techniques, ground water exploration, ore estimation, oil and natural gas and radioactive minerals etc.

Program Specific Outcome of M.Sc. (geology)

- Understanding of the fundamental laws in earth sciences andcapabilityofdevelopingideasbasedonthem.
- Prepare and motivate students for research studies in earthsciencesandrelated subjects.
- Develop ample knowledge of a wide range of geological techniques andapplication of geological methods/principles in other interdisciplinarydomains.
- Provide advanced knowledge on topics in various branches of geology,empowering the students to pursue higher degrees at reputed academicinstitutions.
- Advance understanding of earth's surface and subsurface processeswhichcanbeused insolvingmodern earthsciencepuzzles.
- Problem solving skills, thinking, creativity through assignments, projectwork.
- Assist students in preparing (personal guidance, literatures) for competitiveexamse.g.NET,GATE,etc.
- developing own consultant services such as mining, ground water exploration, and surveying of land use and land cover mapping
- Presentations in national/state level seminars and symposia.

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MSc Geology **Course Outcomes**

S. No.	Code	Paper	PaperTitle	
Semester - I			**Theory**	
1	G 101 T	I	Crystallography, Optical Mineralogy & Mineralogy	➢ Basicknowledgeoncrystalstructuresandbondingandlaws ➢ Silicatestructuresandtheir physicalandchemicalproperties ➢ Bragg'slaw,applicationofX-raytechniqueinidentificationof mineralsthroughcrystalstructures
2	G 102 T	II	Structural Geology & Geotectonics	➢ Rheologicalbehaviorofrocks ➢ Deformationmechanism,calculationofstress ➢ Measurementofstrains,elasticandplasticdeformation Classification, origin,mechanismsoffolds,faultsshear zones ➢ Geomagnetic fields, paleomagnetism, polar wander,geomagneticpolereversal,seafloors preading ➢ Plate boundaries,platemotionanddynamics ➢ Relativeplatemotion–geodeticmeasurement
3	G 103 T	III	Palaeontology and Stratigraphy	➢ Micro-palaeontology and Plant fossils ➢ Vertebrate palaeontology: Fishes, Amphibians, Reptiles ➢ General characters, classification and evolution of :Mammals, Horse, Elephant and Man ➢ Principles of stratigraphy and Precambrian stratigraphy ➢ Palaeozoic stratigraphy, Mesozoic stratigraphya and Cenozoic stratigraphy ➢ Stratigraphic boundary problems in Indian geology
4	G 104 T	IV	Geomorphology & Field Geology	➢ Landform:exogenicandendogenicprocesses ➢ Landformandtectonics ➢ Drainagepattern ➢ Toposheets , Geological map , Field work and sampling and Geological mapping procedures ➢ Geographic positioning system and Surveying ➢ Principles and methods surveying

			Practicals	
5	G 105 P	I	Crystallography + Mineralogy & Optical Mineralogy	➢ Study of important crystal models corresponding to Normal Class of Cubic, Tetragonal, Trigonal,Hexagonal,Orthorhombic,Monoclinic, Triclinic systems. ➢ StereographicprojectionsontheWulf'sStereonet. ➢ MegascopicandMicroscopicstudiesoftherockforming minerals:Olivines,Pyroxenes,Amphiboles, Micas,Feldspars,Feldspathoids,Silica&Alumino Silicates,MiscellaneousmineralssuchasApatite,Zircon,Magnetite, Ilmenite,Calcite,EpidoteandSphene etc,. ➢ Centering,orthoscopic&conoscopicarrangement ofthepetrologicalmicroscope. ➢ Determinationofrelativerefractiveindex(RI)ORreliefofmineralsbyBecketest. ➢ DeterminationofSignofelongation&Pleochroicscheme ofminerals. ➢ DeterminationofopticsignofUniaxial&Biaxialminerals. ➢ DeterminationofAnorthitecontent ofPlagioclasebyMichel LevyMethod
6	G 106 P	II	Geomorphology & Palaeontology Field Geology, Structural Geology	➢ Intra-conversionofscalesoftoposheets. ➢ Studyof contour-variations andelevations on toposheets. ➢ Identificationandclassificationofvarioustypesoffluvial,aeolin,Glacialandvolcaniclandformsontoposheets,geologicalmaps,aerialphotosandLansatimageries. ➢ Identification, demarcation and classification of folds & faults, lineaments, drainagebasin,Morphometryanalylsis, gullypatterns, from thetoposheet. ➢ Preparationoflanduse-andlandcover-mapsfrom toposheet. ➢ Identificationandclassificationofgeomorphological unitsontoposheet,aerialphotos,Landsat imageriesMorphology,Classification,GeologicalAgeandStratigraphicpositionofimportantfossilsofProtozoa,Corals,Gastropoda,Cephalopoda,Lamellaebranchia,Brachiopoda,Echinodermata&Arthopoda,Plant,Microfossilsand Vertebrate fossils ➢ Reconstructionoffolds,determination ofthedepth&heightattheendofthesection. ➢ Vertical &Inclinedfault problems;standard geologicalmaps.

				➢ Mapswithuniformlydippingbeds/unconformablebeds,bedsdippingwithdifferentdip amountsand directions, folded &faulted formations, intrusives / unconformities. ➢ Mapsofgeotechnicalimportance
7	G 107 P		Communicative English & Soft Skills	Soft skills are attributes that enable the student to engage in meaningful interactions with others. Since most jobs require teamwork, it's important to possess soft skills to enhance your employability and achieve your dream job. They will help you increase your productivity in your career, build professional relationships and thrive at your job
8	G 1		Seminar	presence a seminar has numerous benefits, including improving communication skills, gaining expert knowledge, networking with others and renewing motivation and confidence
Semester - II			**Theory**	
1	G 201 T	I	Igneous Petrology & Geochemistry	➢ Origin of magmas, Phase equilibrium in igneous systems, Bowen's reaction principle, Magmatic evolution and differentiation, Structures and textures, Classification of igneous rocks and Magmatism and tectonics ➢ Igneous rock suites, Ultramafic igneous rocks Basic igneous rocks, Intermediate igneous rocks, Felsic igneous rocks Alkaline rocks Carbonatites and Ophiolite suite ➢ Geochemistry, Elements, Meteorites, Primarygeochemicaldifferentiationofearth, Goldschmidt'sgeochemicalclassificationofelements, Periodic table, Magmatismasgeochemicalprocess:Majorelementaldistributioninigneousrocks and Trace element distribution inigneousrocks ➢ Sedimentation as a geochemical process, Metamorphism asageochemicalprocess: Isotopegeochemistry, Stable isotopes, Radiogenicisotopes, Radiometric dating and Atmosphericgeochemistry
2	G 202	II	Metamorphic	➢ MetamorphicPetrology, Classification,

	T		Petrology & Thermodynamics	Structuresandtextures , Conceptsofmetamorphism and Phaserelations ➢ Contact metamorphism and Regional metamorphism ➢ Phaserule, P-Tdiagrams, Paired metamorphic belts and Pressure vs metamorphic minerals ➢ Thermodynamics, thermodynamics, Chemical potential, Chemicalprocesses, Internalenergy, Entropy, Enthalpy and Freeenergy
3	G 203 T	III	Sedimentology & Petroleum Geology	➢ *Sedimentology:Sedimentaryenvironments* ➢ *Evolutionofsedimentarybasins and Tectonicsettingofsedimentarybasins* ➢ *PetroleumGeology: Constitution Reservoir rock, Origin and Oiltraps* ➢ *Explorationandexploitationofpetroleum and Distribution*
4	G 204 T	IV	Ore Genesis and Mineral Deposits	➢ Oregenesis, Oremineralgroups, Metallogeny, Ore textures, Paragenesis, Oremicroscopy, Fluidinclusionstudy, Isotopic ore genesis ➢ Ore associations ➢ Oresofsedimentaryaffiliation, metamorphicaffiliation Ore deposits ➢ Ore deposits: Study of geology, nature of occurrence and the genesis various ore deposits with special reference to India ➢ Mineral based Industries and Refractories:Iron & steel andCeramic, electrical and insulators and glass
			Practicals	
5	G 205 P	I	Igneous Petrology & Metamorphic Petrology and Geochemistry	➢ MegascopicandMicroscopicstudiesofultramafic,mafic(basic),intermediateandfelsic(acidic)igneous rocks. ➢ Modalclassificationofultramafic,maficintermediateandacidicigneousrocksfollowingthe IUGS nomenclature. ➢ Chemicalclassificationofigneousrocksonthe(Na_2O +K_2O)vsSiO2diagramofLeBasetal.(1986)LeMaitreetal (2002) ➢ CalculationoftheCIPWnormofGabbro,Diorite,Granite,SyeniteandNephelineSyenite. ➢ Mineralformularecalculationof Olivine,Pyroxene, Amphibole,Mica,Feldspars,Feldspathoid ➢ Preparation and interpretation of Binary variation

				diagrams for whole rock major andtrace element compositions of igneous rock suites using Harker's diagram and Ternaryvariationdiagrams ofAFM and Ca-Na-K diagrams, ➢ Preparationandinterpretation ofREEpatternsfor commonigneousrocks ➢ MegascopicandMicroscopicidentificationofmetamorphicrocks:Slates,Phyllites,Gneisses.Schists,Amphibolites,Charnockites,Khondalites,Eclogites,MarblesandQuartzites. ➢ ConstructionandinterpretationofACF,AFM&AKF diagrams
6	G 206 P	II	Sedimentology & Ore genesis ,Mineral Deposits	➢ Megascopic and MicroscopicofClasticand Non-Clastic ofsedimentaryrocks. ➢ Grainsizeanalysis bysievingmethod. ➢ Heavymineral(zircon, rutileand tourmaline,ZRT)analysis usingBromoform. ➢ Estimationofsphericityand roundnessof grains. ➢ Identification of sedimentary str ➢ Constructionandinterpretationofrosediagramsusing palaeocurrentdata. ➢ Classificationofsedimentaryrocksbyplottingthemodalandwholerockchemicalcompositionsin relevant triangular diagrams. ➢ Studyandinterpretationoflithofaciesmaps. ➢ Classificationofstromatolites(algalbioherms)using Loganetal(1964)scheme ➢ Demonstration and study of ore microscope with respect to the nature of reflectedlightand magnifications byobjectives. ➢ Ore sample preparation for ore petrography: polishing, mounding and cleaning withxylene. ➢ Identification,classification of texturesand paragenesisof pyrite,Pb,Sphalerite,Bornite,Arsenopyrite,Chalcocite,Pyrrhotite,Fe,MnandCroresunderoremicroscope
7	G 207 P		Human Values & Ethics	It is absolutely important to teach moral values in students because **it is then that they take their first steps towards life, and it matters that they do it right**. These moral values shape their attitudes, beliefs, and ideas and help them develop into undeterred and morally strong individuals
8	G 2		Seminar	presence a seminar has numerous benefits, including improving communication skills, gaining expert knowledge, networking with others and renewing motivation and confidence

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Semester – III			**Theory**	
1	G301 T	I	MineralExploration	➢ Geologicalexploration and Guidestooredeposits ➢ Geologictechniquesandproceduresofexploration, Drillinganditsapplication, Resourcesandreserves and UNFCclassification ➢ Geophysical exploration, Geophysical instruments, Geophysicalprospecting and Logging ➢ Geochemicalexploration, Primaryenvironment and Secondaryenvironment
2	G302 T	II	Precambrian Geologya ndCrustal Evolution	➢ Cratons and Granite-gree nstone belts ➢ Mobile belts ➢ Proterozoicsedimentarybasins, Palaeoproterozoicbasins, Meso-Neoproterozoicbasins and boundary problem ➢ Precambrianigneousintrusions, PrecambrianigneousintrusionsinPuranabasins, Evolution:Evolutionoflithosphere,hydrosphere,atmosphere,biosphereandcryosphere.Lifein Precambrian
3	G303 T	III	MiningGeology & Engineering Geology	➢ Geologicalfactorsconsideredfortheselectionof miningmethod, Geological conditions and Typesofdrillingmethods ➢ Alluvialmining/placerminingmethods, Opencast/open pit/pit mining – Methods, Undergroundminingmethodsforepigeneticand beddeddeposits, Drainage-planning and Mining hazards ➢ Concept of geological investigation in engineeringprojects ➢ Conceptofbuildingmaterialsandsource ➢ Reservoiranddam:types ➢ Criteriafordamsiteselection, Tunnels stability of tunnels, criteria for selecting tunnelsite
4	G304 T	IV	MineralEconomicsa ndFuels	➢ Renewableandnon-renewableresources Mines and Minerals Regulation & Development Act

				➢ *Coal* Chemicalcharacterization, Geologicalandgeographical distribution of coal deposits in India ➢ Methodsofcoalprospectingandestimationofcoalreserves, Coal bed methane and Principles of Coalpetrology ➢ *Atomic Fuel,* Atomicminerals as source of energy, Nuclear power plants of the country and futureprospects.Atomic fuels and environment
			PRACTICALS	
5	G305 P	I	Mineral Exploration & MiningGeology& MineralEconomics	➢ Calculationofassayvaluesoftheoredeposit,Tonnagebygridpattern,Vein-typeoredepositwith Regular andIrregularintervals, ➢ Studyof areaof influenceof oresamples, ➢ EstimationofRestrictedandNon-RestrictedleaseholdsbyTriangularandPolygonalmethods. ➢ OrereserveestimationbyGeometrical,Cross-Sectional and byGraphicalmethods. ➢ Studyof theGeophysicalinterpretationofGravity,Magnetic surveydataandSeismicprofilesofacross southernIndia andBombay-high ofseismic mapof India ➢ Electricalresistivitysurvey:WennerandShlumberger methods ➢ Plottingand interpretation ofelectrical resistivitysurveydata ➢ Calculationofthresholdvalueof Cu,Pb,Zn,fromstreamsediments, ➢ Preparationandinterpretationofgeochemicalmapof Au,Ag,Pt,fromthe data, ➢ Preparationofcrosssectionsanddeterminationoflocalthreshold,regionalthresholdandgeochemical anomalyfrom the geochemicalmap ofCu, Mn,Pb, Ag ➢ Determinationofdirectionanddipofsub-surfacemineraldeposit,persistence of coal seam at depths, true dip based on apparent dips, true dipand direction of the mineral in a quarry face, vertical

				thickness of dippingmineralizationin different directions. ➢ Determination of true dip, dip direction, thickness and distanceof outcrop fromthenearest borehole. ➢ Estimationofreservesinundergroundmineusingbore holedata. ➢ Alignment of Adit, Shaft and incline in a moderately dipping ore bodyand in a steeplydippingorebody ➢ MinePlanning–Open-cast&Undergroundminingexerciseongeologicalsection
6	G306 P	II	PrecambrianGeology andEngineeringgeology	➢ Megascopic andmicroscopicdescriptionofPrecambrianrocks ➢ Demarkatethedifferent CratonsinthePeninsularIndia ➢ PlottingofKimberlites,AnorthositesandAlkalinerocksinthePrecambrianshiedof India. ➢ DemarcatePuranaBasinsinthePrecambrian shieldof India ➢ Preparationofrockspecimenforlaboratorytestingasperthemethodof IS:9179(1979), ➢ Determination ofunconfinedcompressivestrengthofsome important rocksas per themethodofIS: 1121, Part I(1974) andIS:13030 (1991), ➢ Determinationofwaterabsorption,apparentspecificgravityandporosityofsomeimportantrocks asperthemethod ofIS: 1974, ➢ Determinationoftensilestrengthofrocksbyindirecttest–BrazilianTestasperIS:10082(1981), ➢ Determinationofaggregateabrasionvalueaspertheme thodofIS:2386,PartIV(1963), ➢ Petrographicexaminationofaggregatesforconcreteas perthemethodofIS:2386,PartVIII(1963), ➢ Calculationofshearstrength ofrocks, ➢ Studyandinterpretationofgeologicalmapspertainingt othemajordamsitesofIndia, ➢ StudyofGeotechnical Map ofIndiapublished byGSI,Studyof geologicalmapspertainingtosomeimportantIndiantunnels. ➢ Interpretation ofstructuralmodelsoftunnels,faultsandfolds

7	ID/P 307T		InterDisciplinarypaper (Students opted a paper offered bytheotherDepartment)	The advantages of an interdisciplinary approach is that it gives the student the power to implement their knowledge in real-life situations, makes them better collaborators and communicators, improves their problem-solving skills and makes them both analytical and creative
8	G3		Seminar	presence a seminar has numerous benefits, including improving communication skills, gaining expert knowledge, networking with others and renewing motivation and confidence
Semester – IV			**Theory**	
1	G401 T	I	MedicalandEnvironmentalGeology	➢ Essential elements and toxicelements, ElementsinAtmosphere, Hydrosphere, Biosphere and Lithosphere in the Earth and Geochemistryof Iodine ➢ Geochemistry of fluoride, Geochemistry of nitrates, Geochemistry of arsenic and health effectwaterhardness. ➢ Fundamental concepts of Environmental Geology-Environmental geosciences, Earth's thermal environment and Climates and Conceptsofecosystem, Earth resources ➢ Elements of Environmental Impact Assessment, ConceptofEHIA and REA ➢ Environmental legislation air act, water act and environmental protection act.
2	G402 T	II	Hydrogeology	➢ Origin,type,ageandVerticaldistributionground water, Rock properties affectinggroundwater and DarcyLaw ➢ Well hydraulics, Pumping tests, Water level fluctuation, Recharge and groundwater legislation ➢ Water well technology, Exploration, geologicalmethods of groundwaterexploration and groundwatermodeling ➢ Ground water quality, salt water intrusion in coastalaquifersandremedial measures and Groundwater pollution

3	G403 T	III	RemoteSensing&GIS	➢ Basicconceptofremotesensing ➢ Photogeology:digitalandconventional ➢ Electromagneticradiation:conceptandtheories,interaction with atmosphere and application ofremotesensing ➢ Remotesensingdata:sourceandsensors ➢ Dataacquisition,satelliteimagery ➢ Arialphotography:typesandinterpretation ➢ GISandGPS
4	G404 T	IV	DisasterManagement	➢ Types and Classification of Natural Disasters Rehabilitationhazards, Vulnerability, Risk anlaysis and reduction andmitigation ➢ Earthquakes, Action duringEarthquakes,Recoveryand rehabilitation afterearthquake, Intensity scales, Seismic activity inIndia, Earthquakes in A. P., Action plan for Earthquakes ➢ Flood mitigation practice, flood management and community perspectives, Riskassessment,Action to be taken before, after and during floods and Cyclonemanagementin coastal area ➢ Drought, Characteristics of drought, Impact on environment, economy, contingency action plans, vulnerability studies floods,earthquakes,drought andcyclones
			Practicals	
5	G405P	I	Hydrogeology,RemoteSensing,GPS&GIS	➢ Determinationofflowdirection ofwater,porosity&permeabilityof rocks ➢ Analysisandinterpretationofhydrographs. ➢ Estimationofinfiltrationcapacity. ➢ Chemicalanalysisofwater. ➢ Pumpingtest– timedrawdownandtimerecoverytestsandevaluationofaquiferparametersand Step drawdown tests. ➢ Resistivitysurveyfor groundwaterexploration. ➢ Studyof well logs. ➢ Studyof Satellitedata; Digitalimagetechniques;Softwareetc ➢ Interpretationofsatellite images –

				FalseColorComposite. ➢ Visualimageinterpretationandextractionofthematicl ayers. ➢ Identificationofstructuresandlineaments. ➢ Delineationoflandforms,studyof geomorphologyand hydro geomorphology ➢ Studyof landuseandland coverand demarcationof drainagebasin. ➢ Identificationofrocktypesandminerals. ➢ Integrationofvariousthematiclayers,groundtruthing. ➢ Aerialphotointerpretation:scale,height,andslopefro maerialphotos;studyofinclinedand vertical photographs. ➢ Reportwritingforreconnaissancesurvey; detailedsurveyandtargeting ➢ Auto-CAD,digitizationtechniques,Auto-CADsoftware,importofimages,creationoflayers, digitization etc. ➢ GIS,Softwares,ARC INFO,ARC-GIS,QGIS,ILWIS. ➢ GeoreferencingtheMapandcreatePointfeature, Line featureandPolygon features. ➢ Exploringand planningdata setsforGIS. ➢ PreparingdatasetsforinputinGISenvironment. ➢ Integrationofspatial andtemporal data ➢ AnalysisandmanipulationofdatainGIS. ➢ Graphicalrepresentation ofdata. ➢ Modellingandextrapolation ofdata. ➢ Reportwriting
6	G406 P	II	EnvironmentalGeology & **Projectwork**	➢ Drainagebasinanalysisandterrainfeaturesevaluation basedontoposheetandsatelliteimageries. ➢ Preparationofrosediagramandergograph(humidity,temperature,rainfall)datainterpretation. ➢ Fieldsurveytechniques in environmentalsampling, base-linedatageneration. ➢ Waterqualitymonitoring,collectionofwatersamplesandanalysis. ➢ Electrochemicalmethods andvolumetricanalysisforfewparameters. ➢ Airqualitymonitoring,demonstrationofinstruments, collectionofairsamplesandanalysis. ➢ Noiselevelmonitoring,dispersionmodels. ➢ EnvironmentalImpactAssessment(EIA). ➢ EnvironmentalManagementPlan(EMP). ➢ Projectwork

7	ID/P4 07T		Inter Disciplinary paper (Students opted a paper offered by the other Department)	The advantages of an interdisciplinary approach is that it gives the student the power to implement their knowledge in real-life situations, makes them better collaborators and communicators, improves their problem-solving skills ad makes them both analytical and creative
8	G4		Seminar	presence a seminar has numerous benefits, including improving communication skills, gaining expert knowledge, networking with others and renewing motivation and confidence

MAHATMA GANDHI UNIVERSITY, NALGONDA
(*Accredited with "B" Grade by NAAC*)

DEPARTMENT OF BOTANY
PROGRAMME NAME: M.Sc. BOTANY
PROGRAMME CODE: 502

Programme Outcomes in M.Sc. Botany

- PG Graduates of are **Professionally Competent** with characteristic **Knowledge-bank, Skill-set, Mind-set** and **Pragmatic Wisdom** in their chosen fields.

- PG Graduates demonstrate the desired sense of being **Seasoned**and exhibit unequivocal **Spiritedness** with excellent qualities of productive contribution to **society** and **nation** in the arena Science and Technology.

- PG Graduates of are mentored such that they exert **Leadership Latitude** in their chosen fields with **commitment to novelty** and **distinction**.

- PG Graduates are directed in understanding of ethical principles and responsibilities, moral and social values in day-to-day life thereby attaining **Cultural** and **Civilized** personality.

- PG Graduates of are able to **Collate** information from different kinds of sources and gain a coherent understanding of the subject.

Programme specific outcomes - MSc Botany

- Students will be able to demonstrate proficiency in the experimental techniques and methods of analysis appropriate for botany.
- Students will be able to explain how organisms function at that level of the gene, genome, cell, tissue, organ and organ –system. Drawing upon this knowledge, they will be able to give specific examples of the physiological adaptations, development, reproduction and behaviour of different forms of life.
- Students will be able to identify the major groups of organisms with an emphasis on plants and be able to classify them within a phylogenetic framework. Students will be able to compare and contrast the characteristics of plants, algae and fungi that differentiate them from each other and from other forms of life.
- Students will have excellent research skills (field, laboratory, plant growth facilities and library.
- Students will be able to know Communications skills to discuss and analyze problems using oral and written communication skills.
- To know about the protection and prevention of plant diseases
- To know the production of biofertilizers
- To discuss about the cultivation of medicinal and aromatic plants

COURSE OUTCOMES – MSc BOTANY

"Phycology and Mycology"

CO1 Narrates the general outline and characteristics of fungi.

CO2 Note on fungal taxonomy, nomenclature and classification and their types

CO3 Understand the Economic Importance of Fungi

CO4 Understand Fungal diseases in plants and animals, diagnostic methods and control measures. Explains the History of Indian Phycology.

CO4 Learn the classification and reproduction of fungi

CO5 Describe the application of algae as food source and biofuel. Observe the role of algae in CO_2 segregation.

"Bryophyta and Pteridophyta"

CO1 State the classification of bryophytes with examples
CO2 Describe economic importance of Bryophytes
CO3 Explain fungus reproduction
CO4 Describe the general features and classification of Pteridophytes

CO5 Mention the origin of seed habit and economic importance of Pteridophytes.

"Taxonomy of angiosperms and medicinal botany"

CO1 Explaining different systems of classification with their principles
CO2 Narrate nomenclature of plants Discuss about molecular markers used to resolve disputes in plant identification
CO3 Explain the application of cytology in to resolve taxonomic disputes
CO4 State the diagnostic features used to identify plants
CO5 Narrate the economic importance of selected plant families
CO6 Explain ethnotherapeutics and ethnopharmacology
CO7 Discuss about economic value of herbals and herbal drugs
CO8 Give an account on the databases of herbs, herbal drugs and in situ conservation through gene bank
CO9 Narrate medicinal uses of selected plant species
CO10 Narrate cultivation practices of selected plant species
CO11 Mention the efficacy of herbal medicine, mode of action and designing of herbal drugs CO12 Comment on pharmacodynamics

" Plant Biochemistry"

CO1 Explain water relationship in plants and different types of transportation in stomatal physiology
CO2 State the schematic representation of photosynthesis and respiration
CO3 Mention about nitrogen metabolism
CO4 Give a detailed account on plant growth hormones and plant growth retardants
CO5 Discuss the role of growth regulators in growth and development
CO6 State biotic and abiotic stresses
CO7 Narrate plant defence mechanism
CO7 Write in detail on metabolic pathways

" Applied Phycology and Mycology"

" Gymnosperms and Embryology"

To studied the detail about general account of the characteristic of gymnosperm and origin, classification

"To know about general account on the characteristics, features of gymnosperms and origin of gymnosperms" "Evaluate the study of morphology, anatomy, reproduction and phylogeny of cycas, pinus, Ephedra and etc, and Economic importance of gymnosperms."

" Plant Anatomy and Palynology"

" Plant Physiology"

CO1 Explains Enzyme kinetics and Clinical and industrial applications of enzymes
CO2 Understand the water relation and Photosynthesis with specific to C3, C4, and CAM pathways and C2 cycle
CO3 Narrate internal and external factors affecting vegetative growth
CO4 Describe mode of action and physiological effects of auxins, gibberellins, cytokinins, abscisic acid, ethylene.
CO5 Discuss various Stress physiology and its resistance mechanism

" Cell Biology, Genetics and Biostastics"

CO1 Brief account of DNA replication
CO2 Detailed view of Transcription
CO3 Overview of cell cycle.
CO4 Programmed cell death
CO5 Gene mutations
CO6 Hardy-Weinberg Law Gene pool Gene frequency
CO7 Brief account of Proto-oncogenes, Oncogenes and tumor suppressor genes Gene interaction
CO8 Linkage analysis.
CO9 Gene therapy , Plant tissue culture, Micro propagation and transgenic plants R - DNA technology. Gene cloning C - DNA libraries restriction mapping
CO10 Transgenic plants importance
CO11 Mean Variance Standard deviation and Standard error Chi-square test. Student's "t" test. Probability distribution (Binomial, Poisson and Normal)

" Environmental pollution and Protection"

CO1 Kinds of pollution, sources, Effects and control .
CO2 Acid rain- causes and effects Water pollution- Sources Effects 0f water pollution.
CO3 Control of water pollution. BOD, COD Hardness of water Criteria of water quality.
CO4 Segregation, equalization, neutralization Effects of toxic metals.
CO5 Biomagnification and Bioaccumilation Bioremediation of toxic metals
CO6 Sources of solid wastes Disposal methods of solid wastes Management of Municipal waste Management types of Municipal waste Management types of Biomedical waste Harmful effects of Biomedical waste Environmental (protection) Act-1986

" Specialization -1 : Biodiversity and Angiosperms"

CO1 Origin and development of biodiversity
CO2 Current magnitude of Global Biodiversity
CO3 Current magnitude of National diversity Botanical regions
CO4 Distribution of Biodiversity-Marine diversity
CO5 Terrestrial diversity
CO6 Diversification of species-Anagenesis Cladogenesis Ecological extinctions

CO7 Monitoring of Biodiversity at Genetic level Population level Species level Species turnover in Ecosystems

CO8 Freshwater ecosystems. Long-term monitoring of ecosystem

CO9 RAMSAR convention, sites, Red data Assessment and use of molecular DNA data on Biodiversity Application of Biotechnology for the utilization of Biodiversity

CO10 Economic value and utilization of Biodiversity - Food and Fodder

CO11 Insecticides and Pesticides Ornamentation A brief account of origin of cultivated plants

" Specialization -2 : Cultivation and phytochemistry of medicinal plants"

CO1 traditional systems of medicine Ayurvedha, Unani &siddha Allopathy

CO2 Economic importance of medicinal and aromatic plants

CO3 Description of distillation Units .Yields and recoveries of different aromatic plants.

CO4 Preparation of Crude drugs in different systems of medicine e secondary metabolites

CO5 Importance of Alkaloids Terpinoids Coumarins Steroids , Flavonoids.

CO6 Importance of Shikimic acid pathway, Mevalonic acid pathway ,Forskolin, Taxol.

CO7 In - situ &Ex - situ conservation

CO8 IPR – Patents

" Ecology and phytogeography"

CO1 Character displacement Allopatric ,Sympatric.

CO2 Ecosystem structure and function population ecology

CO3 Density, Natality, Mortality, Population regulation; life history strategies (r and K selection) CO4 Mutualism, Symbiosis Cover and Basal area Physiognomy, Phenology Biodiversity, Monitoring, Hotspots (with reference to India)

CO4 Major drivers of biodiversity change Theory on plant distribution (Age and area theory,)

CO5 Theory of tolerance Major terrestrial biomes; Green house gases Global warming, Ozone depletion .

CO6 Biosphere reserves and Project tiger Ex situ - Botanical gardens Zoological parks and cryopreservation.

"Plant Molecular Biology"

CO1 Narrate the distribution, structure and function of cellular organelles

CO2 Discuss the principles of various analytical instruments and their applications in biology

CO3 Differentiate various cell types

CO4 State the composition of cell wall in plant cells

CO5 Explain the ultra structure of various organelles in plant cell

CO6 Narrate cell division Discuss variations in plant genome organization

CO7 Narrate receptor mediated cell signalling pathways and intracellular signal transduction pathways

" Specialization – 1, Taxanomy of Angiosperms and Ethno Botany-"

CO1 Contribution of R.M.T. Dahlgren R.M.T. Dahlgren Classification system Thorne Classification system.

CO2 Botanical Institutions and Taxonomy Botanical Survey of India - CNH Botanical Laboratory

CO3 Growth of taxonomy in South India Importance of floristic studies

CO4 Ethnobotany as an inter-disciplinary science. The relevance of Ethnobotany in the present context

CO5 Methodology of ethnobotanical studies-Herbarium Field work Ancient literature Archaeological findings

CO6 Plants Vs. Tribal Life - Food plants

CO7 Role of ethno botany in modern medicine-sarpagandha, cinchona

" Specialization -2 - Pharmacognosy"

CO1 Pharmacognosy and modern medicine Crude plant drugs

CO2 Indigenous tradional drugs

CO3 Market adulterations of plant drugs

CO4 Evaluation of the drugs

CO5 Types of reactors used and extraction methods

CO6 Preparation of crude drugs in Ayurveda, Siddha,Unani.

CO7 Quality control test – contamination, Adulteration

MAHATMA GANDHI UNIVERSITY, NALGONDA
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DEPARTMENT OF COMPUTER SCIENCE & INFORMATICS
PROGRAMME NAME: M.C.A.
PROGRAMME CODE: 862

MCA PROGRAM- PROGRAM OUTCOMES (POs):

a. An ability to apply knowledge in computer applications to become successful professionals.

b. An ability to develop logic and understand the essential mathematics related to Information Technology.

c. An ability to Design, implement, and evaluate a software product.

d. An ability to apply skills for solving technical problems in software development.

e. An ability to familiarize with emerging & advanced software tools.

f. An ability to experience the industrial environment for understanding the impact of computational solutions in a global & societal context.

g. An ability to analyse the knowledge of contemporary issues.

h. An ability to apply professional ethics.

i. An ability to get readiness to collaborate in a multi-disciplinary team.

j. An ability to communicate effectively.

k. An ability to participate in life-long learning.

l. An ability to handle the projects through appropriate project management techniques.

MCA PROGRAM- PROGRAM SPECIFIC OBJECTIVES (PSOs):

1. To gain knowledge and proficiency for analysis, design and problem solving, to have a successful career in industry and for higher studies.

2. To promote application of technical knowledge coupled with project management abilities.

3. To imbibe leadership qualities with professional ethics and communication skills.

4. To provide positive attitude for lifelong learning.

MAHATMA GANDHI UNIVERSITY, NALGONDA

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MCA PROGRAM- COURSE OUTCOMES (COs):

Semester I

PCC101**:** Mathematical Foundations of Computer Science
Course Outcomes: After completion of the course, Students will be able to 1. Solve logic problems 2. Represent the relations and functions 3. Create recurrence relation 4. Apply algebraic structures 5. Work on various graph and tree concepts

PCC102: Data Structures using C
Course Outcomes 1. Implement linear and non-linear data structure operations using C 2. Suggest appropriate linear / non-linear data structure for any given data set. 3. Apply hashing concepts for a given problem 4. Modify or suggest new data structure for an application 5. Appropriately choose the sorting algorithm for an application

PCC103**:**Object Oriented Programming using Java
Course Outcomes: After completion of the course, Students will be able to 1. Explain OOPs features and concepts 2. Write basic Java programs 3. Write I/O programs in Java 4. Use various built-in Java classes and methods 5. Create window based Java programs

PCC104**:**Computer Architecture
Course Outcomes: After completion of the course, Students will be able to 1. Apply data representation methods 2. Write logic diagrams for microoperations 3. Write general register organization diagrams

4. Analyze computer arithmetic algorithms.
1. Explain I/O organization

PCC105**:**Probability & Statistics

Course Outcomes:

After completion of the course, Students will be able to

1. Understanding of Linear Algebra will boost the ability to understand and apply various data science algorithms.
2. Calculate probabilities by applying probability laws and theoretical results, knowledge of important discrete and continuous distributions, their inter relations with real time applications.
3. Understanding the use of sample statistics to estimate unknown parameters.
4. Become proficient in learning to interpret outcomes.
5. Compute and interpret Correlation Analysis, regression lines and multiple regression analysis with applications

MGC106**:**Managerial Economics and Accountancy

Course Outcomes:

After completion of the course, Students will be able to

1. Apply the fundamental concepts of managerial economics to evaluate business decisions Understandtypes of Demandandfactors related to it.
2. Identify different types of markets and determine price–output under perfect competition.
3. Determine working capital requirement and payback
4. Analyze and interpret financial statementsthrough ratios

LCC151**:**Data Structures using C Lab

Course Outcomes:

After completion of the course, Students will be able to

1. Write basic and advanced programs in C
2. Implement functions and recursive functions in C
3. Implement data structures using C
4. Choose appropriate sorting algorithm for an application and implement it in a modularized way

LCC152**:**JavaProgramming Lab
Course Outcomes: After completion of the course, Students will be able to 1. Be able to write simple java programs 2. Be able to write multithreaded programs 3. Be able to write I/O programs 4. Be able to write serialization programs 5. Be able to write URL class program

HSC153**:**Soft Skills Lab
Course Outcomes: After completion of the course, Students will be able to 1. Express conversational skills 2. Specify reading strategies 3. Perform time management 4. Perform stress management 5. Explore career planning

Semester II

PCC201**:** Operating Systems
Course Outcomes: After completion of the course, Students will be able to 1. Explain operating systems and illustrate the workings of various components. 2. Analyze the process, its states and process scheduling algorithms. 3. Demonstrate paging, demand paging, page replacement and segmentation with illustrations. 4. Elaborate the file access and allocation methods and mass storage structures. 5. Describe concrete implementations of Linux system and Windows 7.

PCC202: Database Management System
Course Outcomes 1. Explain the DB concepts and model requirements as ER-model 2. Suggest relational algebra queries from text specification 3. Write SQL queries for the given questions 4. Elaborate indexing and hashing 5. Describe concurrency control concepts

PCC203**:Design and Analysis of Algorithms**
Course Outcomes: After completion of the course, Students will be able to 1. Carry out algorithms time complexity 2. Explain divide and conquer approach 3. Illustrate greedy method 4. Elaborate dynamic programming 5. Explore backtracking

PCC204**:Artificial Inteligence**
Course Outcomes: After completion of the course, Students will be able to 1. Solve search problems 2. Apply propositional, predicate calculus and knowledge representation 3. Analyze probability theory 4. Explore machine learning 5. Explain NLP

PCC205**:**Machine Learning
Course Outcomes: After completion of the course, Students will be able to 1. Solve regression techniques 2. Apply dimensionality reduction methods 3. Analyze classification schemes 4. Explore clustering mechanisms 5. Explain evaluation metrics.

PCC206**:**Operational Research
Course Outcomes: After completion of the course, Students will be able to 1. Solve linear problems 2. Apply transportation problems 3. Analyze assignment problems

4. Explore dynamic programming
5. Explain gaming theory

LCC251**:Operating Systems** Lab

Course Outcomes:

After completion of the course, Students will be able to

1. write programs on CPU scheduling
2. create memory management algorithms
3. execute programs to demonstrate synchronization problems
4. implement file allocation methods
5. create disk scheduling algorithms

LCC252**:**DBMSLab

Course Outcomes:

After completion of the course, Students will be able to

1. Write SQL queries
2. Write stored procedures
3. Write triggers
4. Use file locking and table locking facilities
5. Create small full-fledged database application

LCC253**:**AI withPython

Course Outcomes:

After completion of the course, Students will be able to

1. Write Machine learning Algorithms in Python
2. Write supervised algorithm programming
3. Write unsupervised algorithm programming
4. Write NLP programming
5. Write neural network programming

Semester III

PCC301: Software Engineering
Course Outcomes: After completion of the course, Students will be able to 1. Apply software processes to solve software problem 2. Create SRS document and software architecture 3. Perform software planning in terms of staffing and scheduling 4. Create test cases and procedures 5. Re-engineer the developed software

PCC302: Computer Networks
Course Outcomes 1. Elaborate the network model 2. Explain transmission media and functions of datalink layer 3. Create routing tables based on DVR and LSR 4. Describe TCP and UDP protocols 5. Explain application layer protocols

PCC303:Data Science
Course Outcomes: After completion of the course, Students will be able to 1. Use various data structures and packages in R for data visualization and summarization 2. Use linear , non-linear regression models, and classification techniques for data analysis 3. Use clustering methods including K-means and CURE algorithm

PCC304:Web Technologies
Course Outcomes: After completion of the course, Students will be able to 1. Write HTML and DHTML programs 2. Create programs on event models 3. Implement java script programs 4. Write VB script programs 2. Create ASP programs

PEC311:Information Security
Course Outcomes:

After completion of the course, Students will be able to

1. Explain the SDLC and security model
2. Describe various issues in information security
3. State the techniques for risk management
4. Elaborate the security technology
5. Specify the cryptography and implementation of information security

PEC312**:**Network Security
Course Outcomes:
After completion of the course, Students will be able to 1. Demonstrate the knowledge of cryptography and network security concepts and applications. 2. Ability to apply security principles in system design. 3. Ability to identify and investigate vulnerabilities and security threats and mechanisms to counter them

PEC313**:**Cyber Security
Course Outcomes:
After completion of the course, Students will be able to 1. Explain the policies and security evolution 2. Describe cyber security objectives and guidance 3. Discuss policy catalog and issues 4. Elaborate cyber management and infrastructure issues 5. Elucidate the case studies on cyber security

PEC314**:S**oft Computing
Course Outcomes:
After completion of the course, Students will be able to 1. Implementing the use of Generic Algorithms in Machine Learning 2. Apply Neural Networks techniques to solve problems 3. Identify the various operations on fuzzy sets, functions and components of fuzzy expert system 4. Able to combine neural networks and fuzzy logic to build Intelligent model/system

PEC321**:**Distributed Systems
Course Outcomes:

After completion of the course, Students will be able to

1. Explain the architecture, processes and communication of distributed system
2. Elaborate the naming and synchronization strategies
3. Describe the fault tolerance and distributed object based system
4. Discuss the distributed file system and distributed web based system
6. Discuss the Distributed Multimedia QoS Principles

PEC322**:**Cloud Computing

Course Outcomes:

After completion of the course, Students will be able to

1. **Elaborate the cloud computing services and resource virtualization**
2. Explain the scaling, planning and file system and storage
3. Describe the database technology and security issues
4. Elucidate portability issues and programming model case study
5. Discuss the enterprise architecture and its related information

PEC323**:**Enterprise Architecture

Course Outcomes:

After completion of the course, Students will be able to

1. Know the fundamentals of EA
2. Understand the business architecture
3. Know the organizational structure of EA
4. Comprehend enterprise engineering
5. Gain insights into cloud computing opportunities for EA

PEC324**:Natural Language Processing**

Course Outcomes:

After completion of the course, Students will be able to

1. Explain elementary probability and information theory
2. Discuss the linguistic essentials
3. Describe statistical inference and word sense disambiguation
4. Elaborate evaluation measures and markov models
5. Elucidate probabilistic context free grammars

LCC351**:Computer Networks Lab**

Course Outcomes:

After completion of the course, Students will be able to

1. Execute basic commands of networks
2. Implement socket program implementation
3. Execute connection oriented socket programs
4. Implement connection less socket programs
5. Execute DNS implementation

LCC352**:Software Engineering Lab**

Course Outcomes:

After completion of the course, Students will be able to

1. Apply use case diagram
2. Apply class and object diagram
3. Apply sequence and collaboration diagrams
4. Apply state-chart and activity diagrams
5. Apply component and deployment diagrams

LCC353**:Data Science Lab**

Course Outcomes:

After completion of the course, Students will be able to

1. Execute R programming basics
2. Implement descriptive statistics
3. Execute reading and writing datasets
4. Implement correlation, covariance and regression model
5. Execute multiple regression model and its use for prediction

PS354**:PROJECT SEMINAR**

Course Outcomes:

Students are to be exposed to following aspects of seminar presentations.

1. Literature survey
2. Organization of material to be presented
3. Preparation of power point Presentation
4. Technical writing

Semester IV

PEC411**: Big Data Analytics**

Course Outcomes:

After completion of the course, Students will be able to

1. Learn how to handle big data
2. Learn hadoop ecosystem
3. Learn mapreduce and hbase fundamentals
4. Learn database concepts related to big data
5. Learn NoSQL fundamentals

PEC412**: Deep Learning**

Course Outcomes

1. Learn deep learning basics and optimization algorithms
2. Understand deep learning computation, CNNs and modersn CNNs
3. Study recurrent neural networks and its modern versions
4. Learn computer vision
5. Comprehend GANs

PEC413**: Information Retrieval System**

Course Outcomes:

After completion of the course, Students will be able to

1. Explain IR strategies
2. Elucidate basic retrieval utilities
3. Discuss cross language IR
4. Describe efficiency aspects
5. Elaborate distributed IR

PEC414**: Optimization Techniques**

Course Outcomes

1. Learn the optimization basics
2. Learn optimization using calculus
3. Learn dynamic programming and its applications
4. Learn integer programming
5. Learn advanced optimization techn

PEC421**: Block Chain Technologies**

Course Outcomes

1. Learn the basics of hash functions
2. Learn the importance of digital signature

3. Understand the structure of a block chain.
4. Learn different ways of storing Bitcoin keys, security measures.
5. Learn how Bitcoin relies on mining

PEC422**: Software Testing**

Course Outcomes

1. Understand the Functional Testing
2. Understand the Structural Testing
3. Comprehend theIntegration and System Testing
4. Understand theobject-Oriented Testing
5. Comprehendto do software testing

PEC423**: Internet of Things**

Course Outcomes

Student will be able to

1. Understand the various applications of IoT and other enabling technologies.
2. Comprehend various protocols and communication technologies used in IoT
3. Design simple IoT systems with requisite hardware and C programming software
4. Understand the relevance of cloud computing and data analytics to IoT
5. Comprehend the business model of IoT from developing a prototype to launching a product.

PEC424**: Digital Forensics**

Course Outcomes

1. Know how to apply forensic analysis tools to recover important evidence for identifying computer crime.
2. To be well-trained as next-generation computer crime investigators.
3. Learn data acquisition
4. Learn processing crimes
5. Learn forensics tools

OE431**: Professional Ethics**

Course Outcomes

1. Explain the developments of legal profession in India
2. Describe the seven lamps of advocacy
3. Elaborate disciplinary proceedings
4. Elucidate the accountancy for lawyers

5. Discuss insights into safety and risk

OE432**:Constitution of India**
Course Outcomes 1. Explain the basics of the constitution 2. Elucidate the structure of the union government 3. Elaborate the state government structure 4. Describe the local administration 5. Discuss the election commission
OE433**: Disaster Management**
Course Outcomes After competing this course, student will be 1. Acquainted with basic information on various types of disasters 2. Knowing the precautions and awareness regarding various disasters 3. Decide first action to be taken under various disasters 4. Familiarised with organisation in India which are dealing with disasters 5. Able to select IT tools to help in disaster management
OE434**: Management Information System**
Course Outcomes After completing the course, the students will be able to 1. Understand and apply the fundamental concepts of information systems. 2. Develop the knowledge about management of information systems. 3. Recommend the use of information technology to solve business problems
OE435**:Intellectual Property and Cyber Law**
Course Outcomes 1. Explain the fundamentals of intellectual property 2. Elaborate the basics of international instruments of IPR 3. Describe the laws concerning copyright in India 4. Discuss the IP in trademarks 5. Explain the concept of patent

OE436**:Environmental Science**
Course Outcomes 1. Explain the scope and importance of environmental studies 2. Elaborate the environment and natural resources

3. Describe the environmental pollution
4. Discuss the regional and sectoral issues concerning environment
5. Explain the social issues and the environment

OE437**: E-Commerce**
Course Outcomes After completion of the subject, Students will be able to 1. Understand the foundations and importance of E-Commerce. 2. Analyze the impact of E-Commerce on business models and strategies 3. Understand legal issues and privacy in E-Commerce

Proj401**: Project Work**
Course Outcomes Students willget exposure to industry based projects.

MAHATMA GANDHI UNIVERSITY, NALGONDA
(*Accredited with "B" Grade by NAAC*)

PROGRAMME NAME: Ph.D. COMPUTER SCIENCE & INFORMATICS
PROGRAMME CODE:

Program Outcomes:
The curriculum is designed according to guidelines of University Grant Commission (UGC) and National Accreditation and Assessment Council (NAAC) to achieve quality and excellence in higher education to accomplish the following objectives.

Core Knowledge
• Students will be able to demonstrate a broad knowledge of areas cutting across the field of Computer Science including systems, applications, and foundations.
• Students will be able to demonstrate a deep understanding and expertise in one or more areas of Computer Science specialization.

Research Methods and Analysis
• Students will be able to understand and identify the range of qualitative and quantitative methodologies typically used in Computer Science research.
• Students will be able to digest and critically analyze the state of computing research guided by an understanding of theory, engineering practice, and the relevant technical literature.
• Students will be able to plan and execute an original research project, analyze relevant findings, and organize results into a coherent argument.

Pedagogy
• Students will be able to communicate technical material to audiences ranging from general to specialized.
• Students will be able to present their research effectively through oral presentations and through the development of supporting materials as appropriate.
• Students will possess classroom management skills, techniques for effective lecturing, and methods for guiding and assessing undergraduate students.

Scholarly Communication
• Students will be able to create effective written technical arguments that contribute to the understanding of the field by their peers.
• Students will be able to review and cogently synthesize relevant literature.
• Students will write in a level and style of English consistent with that found in leading academic conferences and journals.
• Students will understand and properly use citations and references to make their technical arguments and justify critical assumptions.

Professionalism
• Students will be able to articulate the importance of contributing technical advances to their professional communities.

• Students will be familiar with the relevant professional societies including, but not limited to, the Association for Computing Machinery (ACM) and the Institute of Electrical and Electronics Engineers (IEEE).
• Students are able to identify their career options post-graduation, both industrial and academic.
• Students will demonstrate a commitment to the thoughtful consideration of fundamental principles of ethical professional conduct.

Independent Research

• Students will demonstrate an ability to develop their own research projects that meet high standards of theoretical and methodological rigor.
• Students will produce scholarship that is comparable in scope and format to articles, books, and conference papers that appear in leading peer reviewed venues and presses in the field of Computer Science.

PPCS 101 MT : Research Methodology in Computer Science
Course Objectives: 1. Understand research problem formulation Design experiments 2. Analyze research related information 3. Write papers and thesis
Course Outcomes: 1. Understand the research process 2. Solve unfamiliar problems using scientific procedures 3. Pursue ethical research 4. Use appropriate tools for documentation and analysis of data
PPCS111 : Real Time Systems
Course Objectives: 1. Develop an understanding of various Real Time Systems Application 2. Obtain a broad understanding of the technologies and applications for the emerging and exciting domain of real-time systems 3. Get in-depth hands-on experience in designing and developing and developing a real operational system.
Course Outcomes: 1. Explain concepts of Real-Time systems and modeling. 2. Recognize the characteristics of a real-time system. 3. Understanding and develop document on an architectural design of a real-time system. 4. Develop and document Task scheduling, resource management, real-time operating systems and fault tolerant applications of Real-Time Systems.
PPCS112 : Mobile Computing
Course Objectives: 1. To learn the basics of wireless voice and data communication technologies. 2. To build working knowledge on various telephone and satellite networks. 3. To study the working principles of wireless LANS and standards. 4. To study principles of adhoc networks and routing. 5. To gain knowledge on integration of mobile networks into Internet. 6. To build skills in working with wireless application protocols to develop mobile applications.

Course Outcomes:

1. Understand about Adhoc Network Routing protocols.
2. Implement and learn about tracking, localization and routing in wireless networks.
3. Implement file transfer, access and authentication-based applications for mobile computing.
4. Explain the structure and components for Mobile IP and Mobility Management.
5. Design and implement mobile applications to realize location-aware computing.

MAHATMA GANDHI UNIVERSITY, NALGONDA
(*Accredited with "B" Grade by NAAC*)

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING
PROGRAMME NAME: B.Tech. CSE
PROGRAMME CODE: 733

PROGRAM OUTCOMES (POs):

- An ability to apply knowledge of computing and mathematics appropriate to the discipline.
- An ability to identify, analyse, research literature, formulate complex problems involving computing.
- An ability to design, implement and evaluate a computational system / solution to customer requirements
- An ability to apply mathematical foundations, algorithmic principles and computer science theory in the modelling and design of computational systems in a way that demonstrates comprehension of the trade-offs involved in design choices.
- An ability to use appropriate techniques, skills and tools necessary for computing practice.
- An understanding of professional, legal, cultural, security, social issues and responsibilities for the computer science and engineering professionals.
- Apply critical thinking skills to provide sustainable solutions and analyse its effect on environment.
- Ability to apply ethical principles to computer engineering practices and professional responsibilities
- An ability to function effectively in teams to accomplish shared computing design, evaluation or implementation goals and lead team in multidisciplinary realm.
- Ability to make effective written and oral presentations and communication that facilitate to work in collaboration.

- Apply project management and software engineering practices to the launch of new programs, initiatives, products, services and events relative to the needs of stakeholders
- Ability to pursue independent study and demonstrate the capabilities for lifelong learning and professional development

B.Tech. CSE - PROGRAM SPECIFIC OUTCOMES (PSOs)

Computer science and Engineering program is structured to give students the knowledge, skills, and experience needed to be successful as an entry-level engineer upon graduation.

- Made meaningful contributions to the computer engineering profession through (for example) service as applied engineers in industry or consulting, professional licensure, advanced degrees and/or publications
- Acquired new, specialized skills needed for professional mobility and growth
- Been effective members of a professional team displaying proficiency at (for example) engineering design, communications, and teamwork skills
- To gain knowledge and proficiency for analysis, design and problem solving, to have a successful career in industry and for higher studies.
- To promote application of technical knowledge coupled with project management abilities.
- To imbibe leadership qualities with professional ethics and communication skills.
- To provide positive attitude for lifelong learning.

B.Tech. CSE - COURSE OUTCOMES (COs):

Semester I

BSC 101: ENGINEERING PHYSICS

Course Outcomes:

After completion of the course, Students will be able to

1. Recall the knowledge and understanding of the SHM, Damped harmonic oscillator and forced oscillator.
2. To understand the various types of crystal structure and crystal defects.
3. Recall the principles of the fundamental laws of electricity and magnetism and make use of these laws to derive Maxwell"s Electromagnetic wave equation and Poynting theorem.
4. Re call the concept of ultrasonics waves and their applications.
5. Explain and illustrate Semiconducting materials along with their applications.
6. Introduction of Superconducting Materials.
7. Summarize various types of Nanomaterials, their preparation methods and list out various Characterization Techniques and applications of Nanomaterials.

PROGRAMME SPECIFIC OUTCOMES

POI: Inculcates Values and Ethics into students

PO2: The Student will learn Teaching Skills

PO3: The Students develop an understanding with regard to rich Culture and Heritage of India

PO4: The student will get mastery over language and literature

PO5: The Students will improve their knowledge with regard to various Dialects of the Language.

PO6: The Student will also learn about the intricate of Journalism.

BSC 102: MATHEMATICS – I

Course Outcomes

After completion of the course, Students will be able to

- find the nature of sequences and series
- Expand functions as a Fourier Series.
- use the knowledge of multiple integrals in finding the area and volume of any region bounded by given curves
- apply this knowledge to solve the curriculum problems

ESE 101: BASIC ELECTRICAL ENGINEERING

Course Outcomes:

After completion of the course, Students will be able to

- To understand and analyze basic electric and magnetic circuits
- To study the working principles of electrical machines and power converters.
- To introduce the components of low voltage electrical installations

ESC 102: ENGINEERING GRAPHICS

Course Outcomes:

After completion of the course, Students will be able to

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to computer-aided geometric design
- Exposure to creating working drawings
- Exposure to engineering communication

- Recognize modern technical tools of engineering drawing like AUTOCAD

Communicate technical aspects through engineering drawing

- Think creatively in getting alternative options to practical problems in engineering

BSC 101: ENGINEERING PHYSICS LAB

Course Outcomes:

After completion of the course, Students will be able to

1. Analyze a Semiconducting device and determine its temperature Coefficient of Resistance, Energy Gap,
1. Determine the Wavelength of Laser source, Sodium Vapour lamp using diffraction grating.
2. Explain the principle of Optical Fiber and determine its Numerical Aperture, Acceptance angle and losses.
3. Determine the characteristics of Thermistor .
4. T o study the characteristics of junction diode.
5. To study Characteristics of the solar cell.

ESC 101: BASIC ELECTRICAL ENGINEERING LAB

Course Outcomes: On successful completion of the course, the student will acquire the ability to:

- Awareness about various electric safety rules to be followed while working with electrical equipment's.
- Explore themselves in designing basic electric circuits
- Identify requirements for electric machines for domestic and industrial purpose

Semester II

BSC 201: ENGINEERING CHEMISTRY

Course Outcomes

After completion of the course, Students will be able to:

1. Explain and apply the knowledge of various electrodes, electrode potentials and Nernst equation to construct electrochemical cells and thereby to calculate EMF of cell.
2. Analyze different types of corrosion, mechanism, factors affecting metallic corrosion and control corrosion by various methods.
3. Explain the origin of UV-Vis absorption in terms of electronic transitions in

determination of structures of various molecules and Analyze microscopic chemistry in terms of atomic and molecular orbitals
4. Classify various energy sources and illustrate the importance and applications of renewable and non-renewable energy sources.

BSC 202: MATHEMATICS – II

Course Outcomes:

After completion of the course, Students will be able to

- solve system of linear equations and eigen value problems
- solve certain first order and higher order differential equations
- determine the analyticity of complex functions and expand functions as Taylor and Laurent series
- evaluate complex and real integrals using residue theorem

ESE 201: PROGRAMMING FOR PROBLEM SOLVING

Course Outcomes:

After completion of the course, Students will be able to

- Able to design algorithms for different problems
- Able to write program for various problems.
- Able to write program for matrix representation.
- Able to perform file handling operations.

HSMC 201: ENGLISH

Course Outcomes:

After completion of the course, Students will be able to

1. Demonstrate the skill of reading to summarize, paraphrase and give an accurate account of authentic texts of various genres
2. Infer and make predictions based on the comprehension of a text
3. Employ Academic Vocabulary appropriately with a distinction of its formal and informal use
4. Apply different reading strategies to comprehend different texts and decode new words encountered
5. Undertake guided and extended writing using accurate grammatical structures and vocabulary

BSE 201 : ENGINEERING CHEMISTRY LAB

Course Outcomes:

After completion of the course, Students will be able to

1. Estimate the hardness and alkalinity of water sample.
2. Apply the principles of Electrochemistry & Colorimetry in quantitative estimations.
3. Estimate the rate constants, of reactions from concentration of reactants/ products as a function of time.

ESC 201 : PROGRAMMING FOR PROBLEM SOLVING LAB

Course Outcomes:

After completion of the course, Students will be able to

- To formulate the algorithms for simple problems
- To translate given algorithms to a working and correct program
- To correct syntax errors as reported by the compilers
- To identify and correct logical errors encountered at run time
- To write iterative as well as recursive programs
- To represent data in arrays, strings and structures and manipulate them through a program
- To declare pointers of different types and use them in defining self-referential structures.
- To create, read and write to and from simple text files

ESC 202 : WORKSHOP PRACTICE

Course Outcomes:

After completion of the course, Students will be able to

- Fabricate components with their own hands.
- Get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
- Assembling different components, they will be able to produce small devices of their interest.
- Apply basic electrical engineering knowledge for house wiring practice.

HSMC 201: English Lab

Course Outcomes: On successful completion of the course, the student will acquire the ability to:

- To enable the students to
- learn the sound systems of English
- learn the word stress in English
- learn the rhythm and intonation of English
- improve their articulation skills and participation skills

Semester III

BSC 301 MT : **MATHEMATICS – III**
(Probability & Statistics)

Course Outcomes

4. Apply various probability distributions to solve practical problems, to estimate unknown parameters of populations and apply the tests of hypotheses
5. Perform a regression analysis and to compute and interpret the coefficient of correlation

ESC 302 CS : **DIGITAL LOGIC DESIGN**

Course Outcomes

4. Able to apply the concepts of Boolean logic, Postulates and Boolean Theorems to solve the Boolean expressions.
5. Able to solve the Complex Boolean logic expressions using Minimization methods.
6. Able to design the combinational, sequential circuits and various adder circuits.
7. Able to apply state reduction methods to solve sequential circuits.

PCC 305 CS : **COMPUTER ORGANIZATION & ARCHITECTURE**

Course Outcomes

7. Understand the basics of instructions sets and their impact on processor design
8. Demonstrate an understanding of the design of the functional units of a digital computer system.
9. Evaluate cost performance and design trade-offs in designing and constructing a computer processor including memory.
10. Design a pipeline for consistent execution of instructions with minimum hazards.
11. Recognize and manipulate representations of numbers stored in digital computers

ESC 303 EC : **BASIC ELECTRONIC ENGINEERING**

Course Outcomes

1. Able to learn about forward biased and reversed biased circuits.
2. Able to plot the V-I Characteristics of diode and transmission.
3. Able to design combinational logic circuits and PLDs.

PCC 304 CS : DATA STRUCTURES USING C++

Course Outcomes

1. Able to analyze the time and space complexities of algorithms.
2. Able to implement linear, non-linear data structures and balanced binary trees
3. Able to analyze and implement various kinds of searching and sorting techniques.
4. Able to find a suitable data structure and algorithm to solve a real world problem.

PCC 311 CS **DATA STRUCTURES USING C++ LAB**

1. Implement the abstract data type and reusability of a practical data structures.
2. Implement linear data structures such as Stacks, Queues using array and linked list.
3. Understand and implements non linear data structures such as Trees, Graphs.
4. Implement various kinds of searching, sorting and traversal techniques and know when to choose which technique.
5. Understanding and implementing hash techniques.
6. Decide a suitable data structure and algorithm to solve real world problem.

PCC 312 CS **COMPUTER ORGANIZATION & ARCHITECTURE LAB**

1. Interpret the principles of Assembly Language Programming, instruction set in developing microprocessor based applications.
2. Develop Applications such as : 8 –bit Addition, Multiplication , Division, array operations, swapping, negative and positive numbers.
3. Analyse the interfaces like serial ports, digital-to-analog Converters and analog-to-digital converters etc.
4. Build interfaces of Input-Output and other units like stepper motor with 8086.
5. Analyse the function of traffic light controller.

PCC 313 CS: **IT WORKSHOP**
(Python & MAT Lab)

1. Implement basic syntax in python.
2. Analyse and implement different kinds of OOP concept in real world problems.
3. Implement MATLAB operations and graphic functions.

Semester IV

HS 401 MT : OPERATIONS RESEARCH

1. Model Physical Problems in Engineering and Management in Mathematical Form.
2. Solve decision making situation problem using the concept of linear programming techniques.
3. Solve transport related problems of Industry.
4. Solve the problems related to assignment of jobs or projects to the employees in IT and Management related , which minimizes the total assignment cost.

HSMC 402 : **BUSINESS ECONOMICS & FINANCIAL ANALYSIS**

Course Outcomes

1. To perform and evaluate present and future worth of the alternate projects and to appraise projects by using traditional and DCF Methods. To carry out cost benefit analysis of projects and to calculate BEP of different alternative projects.

PCC 403 CS : **OBJECT ORIENTED PROGRAMMING THROUGH JAVA**

Corse Outcomes

1.Undertand the object oriented programming concepts

2. Understanding the packages and interfaces

3.Understanding the concept exception handling and multithreading

PCC 405 CS **: OPERATING SYSTEMS**

Course Outcomes

1. Will be able to control access to a computer and the files that may be shared.
2. Demonstrate the knowledge of the components of computer and their respective roles in computing.
3. Ability to recognize and resolve user problems with standard operating environments.
4. Gain practical knowledge of how programming languages, operating systems, and architectures interact and how to use each effectively.

PCC 404 CS : **DESIGN & ANALYSIS OF ALGORITHMS**

Course Outcomes

1. Ability to analyze the performance of algorithms
2. Ability to choose appropriate data structures and algorithm design methods for a specified application
3. Ability to understand how the choice of structures and the algorithm design methods impact the performance of programs.

MC 405 CE : **ENVIRONMENTAL SCIENCES**

Course Outcomes

1. Undertanding the importance of economical balance for sustainable development
2. Understanding the impacts of developmental activities and mitigation measures

PCC 412 CS **: OPERATING SYSTEMS LAB**

Course Outcomes

1. Simulate and implement operating system concepts such as scheduling, deadlock management, file management and memory management.
2. Able to implement C programs using Unix system calls.

PCC 413 CS : **DESIGN & ANALYSIS OF ALGORITHMS LAB**

Course outcomes

1. Develop the feasible and optimal solutions by using Greedy and dynamic programming.

2. Able to design the searching algorithms

PCC 411 CS : **JAVA LAB**

1. Able to use classes and interfaces efficiently for implementation of various applications.
2. Able to implement Event handling mechanisms using java programs.

Semester V

HSMC 501 **: PRINCIPLES OF MANAGEMENT**

Course Outcomes

1. Towards the end of the course it is expected that the student would be matured enough to apply the industrial management concepts and techniques in real life situations.

ESC 502 CS **: FUNDAMENTALS OF DATA SCIENCES**

Course Outcomes

1. Identify the types of data
2. Understand about how to collect the data, manage the data.
3. Classify the data using svm and navie Bayesian
4. Apply coding techniques to data for securing the data

PCC 503 CS : **DATABASE MANAGEMENT SYSTEMS**

Course Outcomes

1. Understand the mathematical foundations on which RDBMS are built.
2. Model a set of requirements using the Extended Entity Relationship Model (EER), transform an EER model into a relational model and refine the relational model using theory of Normalization
3. Develop Database application using SQL and Embedded SQL
4. Use the knowledge of file organization and indexing to improve database application performance
5. Understand the working of concurrency control and recovery mechanisms in RDBMS

PCC 504 CS : **SOFTWARE ENGINEERING**

Course Outcomes

1. Acquire working knowledge of alternative approaches and techniques for each phase of software development.
2. Acquire skills necessary for independently developing a complete software project
3. Understand the practical challenges associated with the development of a significant software system.

PCC 505 CS : **AUTOMATA LANGUAGES & COMPUTATION**

Course Outcomes

1. Design Finite State Machine, Pushdown Automata, and Turing Machine
2. Determine a language's place in the Chomsky hierarchy (regular, context-free, recursively enumerable)
3. Convert among equivalently powerful notations for a language, including among DFAs, NFAs, and regular expressions, and between PDAs and CFGs
4. Explain why the halting problem has no algorithmic solution.

PE 513 CS : **PRINCIPLES OF PROGRAMMING LANGUAGES**

Course Outcomes

1. Acquire the skills for expressing syntax and semantics in formal notation.
2. Identify and apply a suitable programming paradigm for a given computing application
3. Gain knowledge of and able to compare the features of various programming languages

PE 514 CS : **ADVANCED OPERATING SYSTEMS**

Course Outcomes

1. Understand the design approaches of advanced operating systems
2. Analyze the design issues of distributed operating systems.
3. Evaluate design issues of multi processor operating systems.
4. Identify the requirements Distributed File System and Distributed Shared Memory.
5. Formulate the solutions to schedule the real time applications.

PE 515 CS : **GRAPH THEORY**

Course Outcomes

1. Write precise and accurate mathematical definitions of objects in graph theory
2. Validate and critically assess a mathematical proof
3. Develop algorithms based on diverse applications of Graphs in different domains

PCC 511 CS : **DATABASE MANAGEMENT SYSTEMS LAB**

Course Outcomes

1. Design and implement a database schema for a given problem
2. Populate and query a database using SQL and PL/SQL
3. Develop multi-user database application using locks

PCC 512 CS **: SOFTWARE ENGINEERING LAB**

Course Outcomes

1. To produce efficient, reliable, robust and cost-effective software solutions and perform independent research and analysis

2. To analysis and design of complex systems and meet ethical standards, legal responsibilities
3. To produce efficient, reliable, robust and cost-effective software solutions and perform independent research and analysis.

ESC 513 CS : **DATA SCIENCE LAB**

Course Outcomes

1. Understand and demonstrate the usage of built-in objects in Python.
2. Analyze the significance of Python program development environment and apply it to solve real world applications
3. Implement numerical programming, data handling and visualization through NumPy, Pandas and MatplotLib modules.

Semester VI

PCC 601 CS : COMPILER DESIGN

Course Outcomes

1. Create lexical rules and grammars for a given language.
2. Generate scanners and parsers from declarative specifications.
3. Describe an abstract syntax free for a small language.
4. Use program analysis techniques for code optimization
5. **Develop the compiler for a subset of a given language**

PCC 602 CS : **COMPUTER NETWORKS**

Course Outcomes

1. Explain the function of each layer of OSI and trace the flow of information from one node to another node in the network.
2. Understand the principles of IP addressing and internet routing
3. Describe the working of various networked applications such as DNS, mail, file transfer and www
4. Implement client-server socket-based networked applications.

OE 611 ME : **INDUSTRIAL ROBOTICS**

Course Outcomes

1. Have knowledge of Robotics, automation, robotics motion, sensors and control, machine vision, roboti programming and roles of robots in industry
2. Understand the working methodology of robotics and automation, motion and control, machine vision and programming, application of robots in industry.
3. Write the program for robot for various applications

OE 612 ME : **MATERIAL HANDLING**
Course Outcomes 1. Ability to understand various conveying systems that available in industry 2. Ability to understand various bulk solids handling systems and their design features 3. Ability to understand and various modern material handling systems and their integration. 4. Ability to calculate number of MH systems required, storage space, cost and maintenance.

OE 613 CS : **NATURAL LANGUAGE PROCESSING**
Course Outcomes 1. Understand the mathematical and linguistic concepts of NLP 2. Design and implement algorithms for NLP problems

OE 614 CS : **MACHINE LEARNING**
Course Outcomes 1. Explain the strengths and weaknesses of many popular machine learning approaches 2. Recognize and implement various ways of selecting suitable model parameters for different machine learning techniques 3. Design and implement various machine learning algorithms in a range of real-world applications.

OE 615 EC : **DIGITAL COMMUNICATION**
Course Outcomes 1. Able to acquires knowledge about information theory and assesses entropy and efficiency of various channels. 2. Able to learn to design an optimum receiver and analyze the error performance of base band and band pass data transmission. 3. Able to understand to design block codes, convolution and cyclic codes. 4. Able to apply suitable digital carrier modulation techniques and coding techniques for various applications for improved spectral efficiency. 5. Able to analyze the performance of spread spectrum communication system.

OE 616 EC : **MICRO PROCESSORS & MICRO CONTROLLERS**
Course Outcomes 1. Understand the architecture of micro processors and micro controller 2. Understand the programming model of micro processors and micro controllers 3. Interface different external peripheral devices with micro processors and micro controllers 4. Analyze a problem and formulate appropriate computing solution for processor or controller based application. 5. Develop an assembly language program for specified application.

PE 621 CS **: DISTRIBUTED SYSTEMS**
Course Outcomes 1. Describe the problems and challenges associated with distributed systems 2. Implement small scale distributed systems. 3. Understand design tradeoffs in large-scale distributed systems

PE 622 CS : **WEB PROGRAMMING**
Course Outcomes 1. Design a website with static and dynamic web pages. 2. Develop a web applications with session tracking and client side data validations 3. Develop web content publishing application that access back-end data base and publishes data in XML format.

PE 623 CS : **COMPUTER GRAPHICS**
Course Outcomes 1. Describe the steps in graphics programming pipe line 2. Write interactive graphics applications using OpenGL geometric primitives 3. Apply affine transformations for viewing and projections 4. Create realistic images of 3-d objects that involve lighting shading aspects 5. Describe the mathematical principles to represent curves and surfaces.

PE 632 CS **: INFORMATION SECURITY**
Course Outcomes 1. Describe the steps in Security Systems development life cycle(SecSDLC) 2. Understand the common threats and attack to information systems 3. Understand the legal and ethical issues of information technology 4. Identify security needs using risk management and choose the appropriate risk control strategy based on business needs 5. Use the basic knowledge of security frameworks in preparing security blue print for the organization 6. Usage of reactive solutions, network perimeter solution tools such as firewalls, host solutions such as antivirus software and Intrusion Detection techniques and knowledge of ethical hacking tools 7. Use ethical hacking tools to study attack patterns and cryptography and secure communication protocols. Understand the technical and non-technical aspects of security project implementation and accreditation

PE 633 CS : **OBJECT ORIENTED ANALYSIS & DESIGN**
Course Outcomes 1. Ability to construct Class diagrams

2. Ability to construct realations among objects
3. Ability to construct deployment and collaboration diagrams.
4. Ability to construct use case diagrams.

PE 634 CS : **IMAGE PROCESSING**

Course Outcomes

1. Analyse images in the frequency domain using various transforms
2. Design and implement algorithms that perform image processing operations such as histogram equalization, enhancement, restoration, filtering and denoising.
3. Explain colour spaces, restoration and enhancement of colour images
4. Develop simple object recognition systems

MC 601 : **CONSTITUTION OF INDIA**

Course Outcomes

1. Meaning of the constitution law and constitutionalism
2. Historical perspective of the Constitution of India
3. Sailent features and characteristics of the Constitution of India
4. Scheme of the fundamental rights
5. The scheme of the Fundamental Duties and its legal status

MC 602 : **ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE**

Course Outcomes

1. After learning the contents of this course, the student would be able to.
2. Ability to understand, connect up and explain basics of Indian Traditional Knowledge modern scientific perspective.
3. To explain holistic life style of yoga science
4. Understand basic structure of Indian knowledge system.

MC 603 : **TECHNICAL COMMUNICATION AND SOFT SKILLS**

Course Outcomes

1. Effectively communicate through verbal/oral communication and improve the listening skills
2. Write precise briefs or reports and technical documents
3. Actively participate in group discussion / meetings / interviews and prepare & deliver presentations.
4. Become more effective individual through goal/target setting, self motivation and practicing creative thinking.
5. Function effectively in multi-disciplinary and heterogeneous teams through the knowledge of team work, Inter-personal relationships, conflict management and leadership quality.

PCC 611 CS : **COMPILER DESIGN LAB**
Course Outcomes 1. Design a compiler given a set of language features. 2. Use the knowledge about patterns, tokens, & regular expressions for lexical analysis 3. Use LEX tools and YACC tools to develop a scanner & parser 4. Design and implement LL9(1), SLR(1),LR(1),LALR and operator precedence parsers 5. Generation of machine code.

PCC 612 CS **: COMPUTER NETWORKS LAB**
Course Outcomes 1. Implement data link layer framing methods. 2. Implement error correction and detection techniques. 3. Implement data link layer protocols. 4. Implement routing and congestion algorithms 5. Implement encryption algorithms 6. Able to create a scenario and study the performance of computer networks and protocols.

PEC 621 CS : **DISTRIBUTED SYSTEMS LAB**
Course Outcomes 1. Write programs that communicate data between two hosts 2. Confiure NFS 3. Use distribution data processing frameworks and mobile application tool kits.

PEC 622 CS : **WEB PROGRAMMING LAB**
Course Outcomes 1. Use Javascript and XHTML to create web pages with advanced interactivity 2. Program basic functions in Javascript and XHTML 3. Use javascript to create functional forms 4. Use Javascript to control browser frames and windows 5. Use cascading style sheets to design web pages.

PEC 623 CS : **COMPUTER GRAPHICS LAB**
Course Outcomes 1. Write interactive graphics applications using OpenGL geometric primitives 2. Create realistic images of 3-d objects with light sources and shading 3. Write animation and walkthrough programs using OpenGL

Semester VII

PC 701 CS: GRID AND CLOUD COMNPUTING

Course Outcomes:

1. Ability to understand various service delivery models of a cloud computing architecture.
2. Ability to understand the ways in which the cloud can be programmed and deployed
3. Ability to understand the security challenges and address the challenges.
4. Ability to understand how Cloud computing helps in solving large scale scientific problems.

PE-IV(PE 741 CS): DATA WAREHOUSING & DATA MINING

Course Outcomes:

Students will be able to

- Examine the types of the data to be mined and present a general classification of tasks and primitives to integrate a data mining system.
- Apply preprocessing statistical methods for any given raw data.
- Devise efficient and cost effective methods for designing and maintaining data warehouses.
- Extract interesting patterns from large amounts of data that can be used for further analysis, for example in machine learning and prediction.
- Discover the role played by data mining in various fields.
- Choose and employ suitable data mining algorithms to build analytical applications
- Evaluate the accuracy of supervised and unsupervised models and algorithms

OE-II(OE 721 CS): ADHOC & SENSOR NETWORKS

Course Outcomes:

- Ability to understand the state of the art research in the emerging subject of Adhoc and Wireless

  Sensor
- Ability to solve the issues in real-time application development based on ASN
- Ability to conduct further research in the domain of ASN

PE-V(PE 751 CS): ARTIFICIAL INTELLIGENCE

Course Outcomes: To enable the students to

- Formulate an efficient problem space for a problem expressed in natural language.
- Select a search algorithm for a problem and estimate its time and space complexities.
- Possess the skill for representing knowledge using the appropriate technique for a given problem
- Possess the ability to apply AI techniques to solve problems of game playing, expert systems,machine learning and natural language processing.

PC 711 CS: GRID & CLOUD COMPUTING LAB

Course Outcomes: To enable the students to

- Ability to install and configure
- Ability to install and configure Globus
- Ability to create an instance using Amazon EC2, Google Compute Engine and Windows Azure
- Ability to create a database instance on the cloud.

PE-IV (PEC 712 CS)LAB: DATA WAREHOUSING & DATA MINING LAB

Course Outcomes: To enable the students to

- Apply preprocessing statistical methods for any given raw data.
- Gain practical experience of constructing a data warehouse.
- Implement various algorithms for data mining in order to discover interesting patterns from large amounts of data.

PC 781 CS: PROJECT STAGE-I

Course Outcomes: To enable the students to

- Demonstrate the ability to synthesize and apply the knowledge and skills acquired in the academic program to the real-world problems.
- Evaluate different solutions based on economic and technical feasibility
- Effectively plan a project and confidently perform all aspects of project management
- Demonstrate effective written and oral communication skills

SI 790 CS: SUMMER INTERNSHIP

Course Outcomes: To enable the students to

- Get Practical experience of software design and development, and coding practices within Industrial/R&D Environments.
- Gain working practices within Industrial/R&D Environments.
- Prepare reports and other relevant documentation.

Semester VIII

PE-VI(PE 861 CS): BIG DATA ANALYTICS

Course Outcomes: To enable the students to

- Understand about Big Data and the technologies to handle Big data
- Understand about Hadoop, Hadoop Ecosystem and various tools .
- Understand HDFS , Map reduce and HBase in Big Data Processing.
- Understand about Big Data and Data Warehouse in data storage.
- Understand about NOSQL databases
- Understand importance of Big Data in Social Media

OE-III(OE 831 CS): FUNDAMENTALS OF IOT

Course Outcomes: To enable the students to

- Understand the various applications of IoT and other enabling technologies.
- Comprehend various protocols and communication technologies used in IoT
- Design simple IoT systems with requisite hardware and C programming software
- Understand the relevance of cloud computing and data analytics to IoT
- Comprehend the business model of IoT from developing a prototype to launching a product.

PCC 882 CS: MAJOR PROJECT WORK

Course Outcomes: Student will able to

- Demonstrate the ability to synthesize and apply the knowledge and skills acquired in the academic
- Evaluate different solutions based on economic and technical feasibility.
- Effectively plan a project and confidently perform all aspects of project management.

- Demonstrate effective written and oral communication skills.

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING
PROGRAMME NAME: B.Tech. EEE
PROGRAMME CODE: 734

B.Tech. EEE - PROGRAM OUTCOMES (POs):

a. An ability to apply knowledge in electrical engineering to become successful professionals.
b. An ability to develop logic and understand the essential mathematics related to Information Technology.
c. An ability to Design, implement, and evaluate a software product.
d. An ability to apply skills for solving technical problems in electrical and software development.
e. An ability to familiarize with emerging & advanced software tools.
f. An ability to experience the industrial environment for understanding the impact of computational solutions in a global & societal context.
g. An ability to analyse the knowledge of contemporary issues.
h. An ability to apply professional ethics.
i. An ability to get readiness to collaborate in a multi-disciplinary team.
j. An ability to communicate effectively.
k. An ability to participate in life-long learning.
l. An ability to handle the projects through appropriate project management techniques.

B.Tech. EEE – PROGRAM- PROGRAM SPECIFIC OBJECTIVES (PSOs):

1. To gain knowledge and proficiency for analysis, design and problem solving, to have a successful career in industry and for higher studies.
2. To promote application of technical knowledge coupled with project management abilities.
3. To imbibe leadership qualities with professional ethics and communication skills.
4. To provide positive attitude for lifelong learning.

B.Tech. EEE - PROGRAM- COURSE OUTCOMES (COs):

Semester I

BSC 101: ENGINEERING PHYSICS
Course Outcomes: After completion of the course, Students will be able to 8. Recall the knowledge and understanding of the SHM, Damped harmonic oscillator and forced oscillator. 9. To understand the various types of crystal structure and crystal defects.

10. Recall the principles of the fundamental laws of electricity and magnetism and make use of these laws to derive Maxwell‟s Electromagnetic wave equation and Poynting theorem.
11. Re call the concept of ultrasonics waves and their applications.
12. Explain and illustrate Semiconducting materials along with their applications.
13. Introduction of Superconducting Materials.
14. Summarize various types of Nano materials, their preparation methods and list out various Characterization Techniques and applications of Nanomaterials.

BSC 102: MATHEMATICS – I

Course Outcomes

After completion of the course, Students will be able to

- find the nature of sequences and series
- Expand functions as a Fourier Series.
- use the knowledge of multiple integrals in finding the area and volume of any region bounded by given curves
- apply this knowledge to solve the curriculum problems

HSMC 101: ENGLISH

Course Outcomes:

After completion of the course, Students will be able to

6. Demonstrate the skill of reading to summarize, paraphrase and give an accurate account of authentic texts of various genres
7. Infer and make predictions based on the comprehension of a text
8. Employ Academic Vocabulary appropriately with a distinction of its formal and informal use
9. Apply different reading strategies to comprehend different texts and decode new words encountered
10. Undertake guided and extended writing using accurate grammatical structures and vocabulary

ESC 102: ENGINEERING GRAPHICS

Course Outcomes:

After completion of the course, Students will be able to

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to computer-aided geometric design
- Exposure to creating working drawings
- Exposure to engineering communication

- Recognize modern technical tools of engineering drawing like AUTOCAD
- Communicate technical aspects through engineering drawing .
- Think creatively in getting alternative options to practical problems in engineering

BSC 101: ENGINEERING PHYSICS LAB

Course Outcomes:

After completion of the course, Students will be able to

1. Analyze a Semiconducting device and determine its temperature Coefficient of Resistance, Energy Gap,
6. Determine the Wavelength of Laser source, Sodium Vapour lamp using diffraction grating.
7. Explain the principle of Optical Fiber and determine its Numerical Aperture, Acceptance angle and losses.
8. Determine the characteristics of Thermistor .
9. T o study the characteristics of junction diode.
10. To study Characteristics of the solar cell.

HSMC 101: English Lab

Course Outcomes: On successful completion of the course, the student will acquire the ability to:

- To enable the students to
- learn the sound systems of English
- learn the word stress in English
- learn the rhythm and intonation of English
- improve their articulation skills and participation skills

Semester II

BSC 201: ENGINEERING CHEMISTRY

Course Outcomes

After completion of the course, Students will be able to

1. Explain and apply the knowledge of various electrodes, electrode potentials and Nernst equation to construct electrochemical cells and thereby to calculate EMF of cell.
2. Analyze different types of corrosion, mechanism, factors affecting metallic corrosion and control corrosion by various methods.
3. Explain the origin of UV-Vis absorption in terms of electronic transitions in determination of structures of various molecules and Analyze microscopic chemistry in terms of atomic and molecular orbitals
4. Classify various energy sources and illustrate the importance and applications of renewable and non-renewable energy sources.

BSC 202: MATHEMATICS – II

Course Outcomes:

After completion of the course, Students will be able to

- solve system of linear equations and eigen value problems
- solve certain first order and higher order differential equations
- determine the analyticity of complex functions and expand functions as Taylor and Laurent series
- evaluate complex and real integrals using residue theorem

ESE201: PROGRAMMING FOR PROBLEM SOLVING

Course Outcomes:

After completion of the course, Students will be able to

- Able to design algorithms for different problems
- Able to write program for various problems.
- Able to write program for matrix representation.
- Able to perform file handling operations.

ESE203: BASIC ELECTRICAL ENGINEERING

Course Outcomes:

After completion of the course, Students will be able to

- To understand and analyze basic electric and magnetic circuits
- To study the working principles of electrical machines and power converters.
- To introduce the components of low voltage electrical installations

BSE 201 : ENGINEERING CHEMISTRY LAB

Course Outcomes:

After completion of the course, Students will be able to

1. Estimate the hardness and alkalinity of water sample.
2. Apply the principles of Electrochemistry & Colorimetry in quantitative estimations.
3. Estimate the rate constants, of reactions from concentration of reactants/ products as a function of time.

ESC 202 : WORKSHOP PRACTICE

Course Outcomes:

After completion of the course, Students will be able to

- Fabricate components with their own hands.
- Get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
- Assembling different components, they will be able to produce small devices of their interest.
- Apply basic electrical engineering knowledge for house wiring practice.

ESC 201 : PROGRAMMING FOR PROBLEM SOLVING LAB

Course Outcomes:

After completion of the course, Students will be able to

- To formulate the algorithms for simple problems
- To translate given algorithms to a working and correct program
- To correct syntax errors as reported by the compilers
- To identify and correct logical errors encountered at run time
- To write iterative as well as recursive programs
- To represent data in arrays, strings and structures and manipulate them through a program
- To declare pointers of different types and use them in defining self-referential structures.
- To create, read and write to and from simple text files

ESC 203: BASIC ELECTRICAL ENGINEERING LAB

Course Outcomes: On successful completion of the course, the student will acquire the ability to:

- Awareness about various electric safety rules to be followed while working with electrical equipment's.
- Explore themselves in designing basic electric circuits
- Identify requirements for electric machines for domestic and industrial purpose

Semester III

PC301EE : ELECTRICAL CIRCUITS - I

Course Outcomes

At the end of the course the students will be able to

1. understand network analysis, techniques using mesh and node analysis.
2. evaluate steady state and transient behavior of single port network for DC and AC excitations.
3. analyze electric circuits using network theorems.
4. understand the concept of coupled circuits and poly-phase circuits.

Semester III

BS301MT : MATHEMATICS -III

Course Outcomes:

After completion of the course, Students will be able to

- solve system of linear equations and eigen value problems
- solve certain first order and higher order differential equations
- determine the analyticity of complex functions and expand functions as Taylor and Laurent series
- evaluate complex and real integrals using residue theorem

PC302EE ELECTRICAL MACHINES – I

Outcomes:

At the end of the course the students will be able to

1. understand construction, operating principle and characteristics of different types of DC motors and generators
2. test and calculate performance parameters of DC motors and generators
3. select appropriate DC machines for a specific application

PC303EE POWER SYSTEMS – I

Outcomes:

1. The students will acquire knowledge in conventional renewable generating power stations and economics of generation
2. The students will acquire knowledge regarding the design concepts of transmission lines and cables.

PC304EE ELECTRO MAGNETIC FIELDS

Outcomes:

At the end of the course students will be able to

1. Formulate problems within electrostatics, magnetostatics and stationary current distributions in linear, isotropic media.
2. Derive expressions for the energy for electrostatic and magnetostatic fields, and derive Poynting's theorem.
3. Calculate the boundary conditions for electric and magnetic fields between different media.
4. Calculate the reflection and refraction coefficients of electromagnetic waves for different conditions.

PC305EE ANALOG ELECTRONICS
Course Outcomes: At the end of this course, students will demonstrate the ability to 1. Understand the characteristics of transistors. 2. Design and analyze various rectifier and amplifier circuits. 3. Design sinusoidal and non-sinusoidal oscillators. 4. Understand the functioning of OP-AMP and design OP-AMP based circuits.

MC101HS ENVIRONMENTAL SCIENCE
Course Outcomes: 1. Will have an awareness of effects of hazardous environment. 2. Will have an idea about optimum utilization of natural resources. 3. Will be a catalyst in moving towards Green technologies 4. Will have information about rules and regulations of pollution control

PC352EE COMPUTER AIDED ELECTRICAL DRAWING LABORATORY
Course Outcomes: **1.** Analyze the efficiency of various scheduling algorithms **2.** Develop solutions for various synchronization problems **3.** Identify and apply the Inter Process communication mechanisms **4.** Ability to write shell programs for different problems.

PC351EE ANALOG ELECTRONICS LABORATORY
Course Outcomes: Students will be 1. Able to design diode circuits. 2. Able to understand the applications of zener diode. 3. Able to understand the operation of HWR & FWR circuits with & without filters. 4. Able to analyze the characteristics of BJTs and FETs. 5. Able to analyze the performance of operation amplifier.

Course Outcomes: After completion of the course, Students will be able to: 1. Define the Environment, its scope and importance that impact the modern society. 2. Describe the Ecosystem, Biodiversity and Natural Resources and their conservation. 3. Distinguish between renewable non-renewable natural resources 4. Apply knowledge of control measures in the Environmental Pollution. 5. Explain the Social Issues and the Environment sustainable resources management.

6. Discriminate among Environmental Valuation, Environmental Economics, and Environmental Pollution.

Semester - IV

PC401EE ELECTRICAL CIRCUITS – II

Outcomes:

At the end of the course the students will be able to

1. Examine the behavior of linear circuits using Fourier transform, Laplace transforms and transfer function of single port network.
2. Obtain two port network parameters and applications of graph theory to electric circuits.
3. Synthesize a network in terms of RL, RC and RLC parameters.

PC402EE ELECTRICAL MACHINES –II

Course Outcomes:

The students will be able to

1) Acquire the knowledge of construction, principle of operation and testing of single phase transformers.
2) Impart the knowledge about three phase transformers, three phase to two phase transformation and their parallel operation.
3) Acquire the knowledge about the constructional details, equivalent circuit parameters and performance characteristics of three phase induction motors.
4) Acquire the knowledge about starting and speed control methods of three phase induction motors.
5) Impart the knowledge of constructional details, principle of operation and types of single phase induction motors.

PC403EE POWER SYSTEMS – II

Course Outcomes:

The students will be able to

1) Acquire modeling of different short, medium and long transmission lines
2) To learn the use of per unit quantities and calculation of symmetrical faults on OH transmission lines
3) Understand the impact of different types of faults on overhead transmission lines and calculation of fault currents and their significance.
4) Explain the reasons for voltage variation, importance of maintaining constant voltage in power system and different voltage control methods.
5) Acquire the knowledge of natural impedance of transmission line and significance in the operation of power system network.

PC404EE DIGITAL ELECTRONICS AND LOGIC DESIGN

Outcomes:

At the end of the course the students will be able to

1. differentiate the number system, convert and compare a number system to another number systems used in digital logic design.
2. understand Boolean algebra and its application to DeMorgan's theorems and karnaugh

map reduction method.
3. analyze and design various digital combinational circuits**.**

ES405ME PRIME MOVERS AND PUMPS

Course Outcomes:
The students will be able to
1) Understand the differences between signal level and power level devices.
2) Analyze controlled rectifier circuits.
3) Analyze the operation of DC-DC choppers.
4) Analyze the operation of voltage source single phase inverters.
5) Analyze the three phase inverters and ac voltage controllers

PC451EE ELECTRICAL CIRCUITS LABORATORY

Outcomes:
At the end of the course the student will be able to.
1. Evaluate the time response and frequency response character sties of R,L,C Series and parallel circuits.
2. Able to validate the network theorems.
3. Able to find various parameters of a two-port network.
4. Able to simulate electrical circuits using spice.
5. Able to synthesize networks from a given transfer function

PC452EE ELECTRICAL MACHINES LABORATORY – I

Course Outcomes:
The students will be able to:
1) Estimate the efficiency and voltage regulation of D.C. generator and transformers under various loading conditions.
2) Acquire the knowledge of efficiency and speed regulation D.C. Motors under various loading conditions.
3) Able to understand the speed control of DC motor by conducting different experiments

ES453ME MECHANICAL TECHNOLOGY LABORATORY

Course Outcomes:
At the end of the course the students will be able to
1. Differentiate the number system, convert and compare a number system to another number systemsused in digital logic design.
2. Understand the applications of 555 timer.
3. Analyze and design various filters, Clippers and Clampers using Op-Amps

Semester - V

PC501EE ELECTRICAL MACHINES-III

Course Outcomes: At the end of the course the students will be able to
1. Acquire the knowledge of types, Constructional Details, characteristics and applications of synchronous generator, synchronous motor, PMSM and brushless DC motors.
2. Explain different methods used to evaluate voltage regulation of synchronous generator.

3. Analyze the behavior of an alternator under transient disturbances.

PC502EE MEASUREMENTS AND INSTRUMENTATION

Course Outcomes: At the end of the course students will be able to
1. Choose the suitable instrument like Ammeter, Voltmeter for AC/DC applications.
2. Select suitable Bridge for measurement of electrical parameters and quantities.
3. Use CRO for measurement of Amplitude, Phase and frequency of sinusoidal signals.

PC503EE LINEAR CONTROL SYSTEMS

Course Outcomes: At the end of the course students will be able to
1. Understand the concept of the terms control systems, feedback, Mathematical modeling of Electrical and Mechanical systems.
2. Explain the time domain and frequency response analysis of control systems.
3. Acquire the knowledge of various analytical techniques used to determine the stability of control systems.
4. Able to understand the importance of design of compensators.
5. Able to demonstrate controllability and observability of moderncontrol systems.

PC504EE MICROPROCESSORS AND MICROCONTROLLERS

Course Outcomes: At the end of the course the students will be able to
1. Understand 8085 microprocessor architecture and its operation.
2. Write assembly language program for a given task.
3. Interface memory and I/O devices to 8085 using peripheral devices.
4. Understand microcontrollers uses and their applications.
5. Write microcontroller programs and interface devices.

PC505 EE POWER ELECTRONICS

Course Outcomes:
The students will be able to
1) Understand the differences between signal level and power level devices.
2) Analyze controlled rectifier circuits.
3) Analyze the operation of DC-DC choppers.
4) Analyze the operation of voltage source single phase inverters.
5) Analyze the three phase inverters and ac voltage controllers

OE501 ME MATERIAL HANDLING

Course Outcomes:
The students will be able to
1) Understand the differences between signal level and power level devices.
2) Analyze controlled rectifier circuits.
3) Analyze the operation of DC-DC choppers.

4) Analyze the operation of voltage source single phase inverters.
5) Analyze the three phase inverters and ac voltage controllers

HS901MB MANAGERIAL ECONOMICS AND ACCOUNTANCY

Course Outcomes: At the end of the course the students will be able to
1. Understand management concepts and apply them to evaluate business decisions.
2. Evaluate the factors that affect production.
3. Estimate working capital requirements.
4. Evaluate of capital budgeting opportunities.
5. Understand the concepts of various book-keeping methods

PE512EE RENEWABLE ENERGY SOURCES

Course Outcomes: At the end of the course students will be able to
1. Explain the advantages, disadvantages and applications of different conventional and non-conventional sources.
2. Acquire the knowledge of various components, principle of operation and present scenario of different conventional and non-conventional sources.

PE513EE HYBRID ELECTRIC VEHICLES

Course Outcomes: At the end of the course students will be able to
1. To identify and describe the history and evolvement of electric & hybrid electric vehicles to emphasize on the need and importance of EV/HEV for sustainable future.
2. To identify and describe the principles of various EV/HEVs drive train topologies along with their power flow control and fuel efficiency estimation.
3. To design and select electric propulsion system components for EV/HEV drives suitability for the desirable performance and control.
4. To compare and evaluate various energy sources and energy storage components for EV and HEV applications.

PC551EE POWER ELECTRONICS LAB

Course Outcomes: At the end of the course students will be able to
1. Able to understand speed control of motors by using controlled rectifier
2. Able to understand the applications of cycloconverters
3. Able to simulate different power electronic devices using software

PC552EE MICROPROCESSOR AND MICROCONTROLLERS LAB

Course Outcomes: At the end of the course students will be able to
1. Familiarize with the assembly language programming.
2. Write programs for given task using different addressing modes.
3. Interface various IO devices using 8255 PPI
4. Write programs using various interrupts.
5. Interface the microcontroller for some real-life applications

PC553EE DIGITAL ELECTRONICS AND LOGIC DESIGN LABORATORY
Course Outcomes: At the end of the course the students will be able to 1. Differentiate the number system, convert and compare a number system to another number systemsused in digital logic design. 2. Understand the applications of 555 timer. 3. Analyze and design various filters, Clippers and Clampers using Op-Amps

Semester - VI

PC601EE SWITCHGEAR AND PROTECTION
Course Outcomes: At the end of the course, students will be able to 1. Acquire the knowledge of construction, working principles of different electromagnetic and static relays used to protect generators, transformers, transmission lines and distribution feeders. 2. Analyze the Characteristics of over current, over voltage, distance and differential relays and also their applications in power system networks. 3. Explain the working principle. Construction, rating and applications of different types of circuit breakers used in power system networks. 4. Understand the construction details, advantages, disadvantages of Gas Insulation substations.

PC602EE SIGNALS AND SYSTEMS
Course Outcomes: At the end of the course, students will be able to 1. Classify and analyze the continuous time signals and discrete time signals and systems. 2. Generate discrete time signals through sampling process and reconstruct them. 3. Determine the responses of continuous and discrete-time systems which are represented bydifferential equations and difference equations. 4. Analyze continuous time systems with the help of Laplace transform and discrete time systemwith Z-transform. 5. Analyze the continuous and discrete-time systems in frequency domain with the help of Fourierseries and Fourier Transform.

PE601EE ELECTRICAL DISTRIBUTION SYSTEM
Course Outcomes: At the end of the course, students will be able to 1. Understand controllers for controlling the power flow through a dc link and compute filter parameters. 2. Apply impedance, phase angle and voltage control for real and reactive power flow in ac transmission systems 3. Analyze and select a suitable FACTS controller for a given power flow condition 4. Evaluate HVDC and EHVAC transmission 5. Analyze converter configurations used in HVDC and their control mechanisms.

PE622EE

LINEAR INTEGRATED CIRCUITS

Course Outcomes: After completion of this course, the students shall be able to:
1. Design and use op-amps for various linear and non-linear applications.
2. Design and use voltage regulators and active filters.
3. Design and analyze multivibrator circuits using op-amp
4. Design and analyze the various applications of 555 timer.
5. Ability to design practical circuits that perform the desired operations

HS901MB MANAGERIAL ECONOMICS AND ACCOUNTANCY

Course Outcomes: At the end of the course the students will be able to

1. Understand management concepts and apply them to evaluate business decisions.
2. Evaluate the factors that affect production.
3. Estimate working capital requirements.
4. Evaluate of capital budgeting opportunities.
5. Understand the concepts of various book-keeping methods

PC651EE

ELECTRICAL MACHINES LAB – II

Course Outcomes: At the end of the course, students will be able to

1. Understand Performance characteristics of single-phase induction motor
2. Understand the importance of Voltage regulation of an alternator
3. Explain different methods used to measure the voltage regulation of an alternator

PC652EE

MEASUREMENTS AND INSTRUMENTATION LAB

Course Outcomes: At the end of the course, students will be able to

1. Measure the inductance, capacitance and resistance using various bridges.
2. Measure resistance and calibrate ammeter, voltmeters and wattmeter using A.C. and D.C. potentiometers.
3. Have hands on experience on the operation of CRO.

PC653EE

CONTROL SYSTEMS LAB

Course Outcomes: At the end of the course students will be able to

1. Able to understand Performance of P, PI and PID Controllers
2. Able to develop PLC programs for certain applications
3. Acquire the knowledge of Data acquisition system and Industrial process control

PW961EE	**SUMMER INTERNSHIP**

Course Outcomes: At the end of the course, students will be able to

1. Design/develop a small and simple product in hardware or software.
2. Complete the task or realize a prespecified target, with limited scope, rather than taking up a complex task and leave it.
3. Learn to find alternate viable solutions for a given problem and evaluate these alternatives with reference to prespecified criteria.
4. Implement the selected solution and document the same.
5. Able to write a technical report and present it to appropriate audience

Semester – VII

MC 701AS: TECHNICAL COMMUNICATION AND SOFTSKILLS

Course Outcomes:

After completion of the course, Students will be able to

1. Demonstrate the skill of reading to summarize, paraphrase and give an accurate account of authentic texts of various genres
2. Infer and make predictions based on the comprehension of a text
3. Employ Academic Vocabulary appropriately with a distinction of its formal and informal use
4. Apply different reading strategies to comprehend different texts and decode new words encountered
5. Undertake guided and extended writing using accurate grammatical structures and vocabulary

PC701EE	**POWER SYSTEM OPERATION AND CONTROL**

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

1. Analyze load flow methods, economic operation and load frequency control of power system.
2. Evaluate the load distribution between generating units economically.
3. Understand the effect of closed loop control of frequency of power system.
4. Determine the stability of power system under various types of disturbances.
5. Understand various compensation methods required in a power system.

PC702EE

UTILISATION OF ELECTRICAL ENERGY

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

1. Acquire the knowledge of various electrical materials used in used in design of electrical system.

2. Analyze magnetic, thermal circuits in electrical machines and their design aspects.

3. Understand the importance of cooling and design of cooling system for various electrical machines and also able to know design AC armature windings in rotating machines.

Course Outcomes: After completion of this course, the students shall be able to:
1. Acquire the knowledge of various electrical materials used in used in design of electrical system.

2. Analyze magnetic, thermal circuits in electrical machines and their design aspects.

PE733EE

POWER QUALITY ENGINEERING

Course Outcomes: After completion of this course, the students shall be able to: 1. Understand the significance of power quality study and identify various power quality disturbances.
2. Write algorithms to calculate voltage sags magnitude and duration in power system.
3. Demonstrate the effect and also analyze the characteristics of voltage sags experienced by ASDs.
4. Evaluate THD and mitigate harmonics in distribution system.
5. Operate and use PQ measuring equipment for assessment of data.

OE710ME INDUSTRIAL ADMINISTRATION AND FINANCIAL MANAGEMENT

Course Outcomes: After completion of this course, the students shall be able to: 1. Think creatively and transform ideas into reality.
2. Differentiate market transforming strategy.
3. Create a complete business plan and workout the budget plan.

PC751EE ELECTRICAL SIMULATION LAB

Course Outcomes

At the end of the course the students will be able to

1. understand network analysis, techniques using mesh and node analysis.
2. evaluate steady state and transient behavior of single port network for DC and AC

excitations.
3. analyze electric circuits using network theorems.
4. understand the concept of coupled circuits and poly-phase circuits.

PC752EE	**POWER SYSTEMS LAB**

Course Outcomes: At the end of the course the students will be able to
1. Acquire the knowledge of types, Constructional Details, characteristics and applications of synchronous generator, synchronous motor, PMSM and brushless DC motors.
2. Explain different methods used to evaluate voltage regulation of synchronous generator.
3. Analyze the behavior of an alternator under transient disturbances.

PW751EE PROJECT STAGE-I

Course Outcomes: After completion of this course, the students shall be able to:
1. Demonstrate the ability to synthesize and apply the knowledge and skills acquired in the academic program to real-world problems.

2. Evaluate different solutions based on economic and technical feasibility.

3. Effectively plan a project and confidently perform all aspects of project management.

4. Demonstrate effective written and oral communication skills

Semester - VIII

PE741EE HIGH VOLTAGE DC TRANSMISSION

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

1. Understand the significance of power quality study and identify various power quality disturbances.

2. Write algorithms to calculate voltage sags magnitude and duration in power system.

3. Demonstrate the effect and also analyze the characteristics of voltage sags experienced by ASDs.

4. Evaluate THD and mitigate harmonics in distribution system.

5. Operate and use PQ measuring equipment for assessment of data.

PE 854EE ELECTRIC DRIVES AND STATIC CONTROL

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

1. Understand the concepts of electrical drives and analyze the motor-load combination.

2. Analyze the starting and braking techniques of DC and AC motors.

3. Design the drive circuits for single phase and three phase, controlled rectifier fed DC motor drives.

4. Implement speed control for Induction motors using variable frequency sources and slip power recovery schemes.

5. Analyze the various modes of variable frequency control, linear induction motor and Permanent Magnet Synchronous Motor drives.

PW851EE PROJECT WORK – II/ INDUSTRIAL INTERNSHIP

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

1. Demonstrate the ability to synthesize and apply the knowledge and skills acquired in the academic program to real-world problems.

2. Evaluate different solutions based on economic and technical feasibility.

3. Effectively plan a project and confidently perform all aspects of project management.

4. Demonstrate effective written and oral communication skills.

MAHATMA GANDHI UNIVERSITY, NALGONDA
(*Accredited with "B" Grade by NAAC*)

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
PROGRAMME NAME: B.Tech. ECE
PROGRAMME CODE: 735

B.Tech. ECE - PROGRAM SPECIFIC OBJECTIVES (PSOs):

1. Graduates apply their knowledge of mathematics and science to identify, analyze and solve problems in the field of Electronics and develop sophisticated communication systems.
2. Graduates exhibit their innovative ideas and management skills to meet the day to day technical challenges.
3. Graduates embody a commitment to professional ethics, diversity and social awareness in their professional career.
4. Graduates exhibit a desire for life-long learning through technical training and professional activities.

B.Tech. ECE - PROGRAM OUTCOMES (POs):

Students can be

a) Able to apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
b) Able to design solutions for complex engineering problems and design system components, processes to meet the specifications with consideration for the public health and safety, and the cultural, societal, and environmental considerations.
c) Able to function effectively as an individual, and as a member or leader in teams, and in multidisciplinary settings.
d) Able to communicate effectively with the engineering community and with society at large. They can be able to comprehend and write effective documentation, make effective presentations, and give and receive clear instructions.
e) Able to communicate effectively and manage resources skillfully as members and leaders of the profession.
f) Able to demonstrate knowledge and understanding of engineering and management principles and apply these to one's own work, as a member and leader in a team. Manage projects in multidisciplinary environments.

g) Able to recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

h) Able to practice the ethics of their profession consistent of social responsibility and develop their engineering design, problem-solving skills and aptitude for innovations as they work individually and multi disciplinary teams.

B.Tech. ECE - COURSE OUTCOMES (COs):

Semester I

BSC 101: ENGINEERING CHEMISTRY
Course Outcomes: After completion of the course, Students will be able to 1. Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces. 2. Rationalise bulk properties and processes using thermodynamic considerations. 3. Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques 4. Gains knowledge in causes of corrosion and its prevention. 5. Attains knowledge about the disadvantages of hard water for domestic and industrial purpose.

BSC 102: MATHEMATICS – I
Course Outcomes After completion of the course, Students will be able to • Find the nature of sequences and series • Expand functions as a fourier series. • Use the knowledge of multiple integrals in finding the area and volume of any region bounded by given curves • Apply this knowledge to solve the curriculum problems

ESE101: BASIC ELECTRICAL ENGINEERING

Course Outcomes:

After completion of the course, Students will be able to

1. To understand and analyze basic electric and magnetic circuits
2. To study the working principles of electrical machines and power converters.
3. To introduce the components of low voltage electrical installations

ESC 102: ENGINEERING GRAPHICS

Course Outcomes:

After completion of the course, Students will be able to

- Introduction to engineering design and its place in society
- Exposure to the visual aspects of engineering design
- Exposure to engineering graphics standards
- Exposure to computer-aided geometric design
- Exposure to creating working drawings
- Exposure to engineering communication
- Recognize modern technical tools of engineering drawing like AUTOCAD
- Communicate technical aspects through engineering drawing
- Think creatively in getting alternative options to practical problems in engineering

BSE 101 : ENGINEERING CHEMISTRY LAB

Course Outcomes:

After completion of the course, Students will be able to

1. Estimate the hardness and alkalinity of water sample.
2. Apply the principles of Electrochemistry &Colorimetry in quantitative estimations.
3. Estimate the rate constants, of reactions from concentration of reactants/ products as a function of time.

ESC 101: BASIC ELECTRICAL ENGINEERING LAB

Course Outcomes: On successful completion of the course, the student will acquire the ability to:

- Awareness about various electric safety rules to be followed while working with electrical equipment's.
- Explore themselves in designing basic electric circuits
- Identify requirements for electric machines for domestic and industrial purpose

MAHATMA GANDHI UNIVERSITY, NALGONDA

(*Accredited with "B" Grade by NAAC*)

Semester II

BSC 201: ENGINEERING PHYSICS
Course Outcomes: After completion of the course, Students will be able to 15. Recall the principles of wave mechanics, fundamental laws of electricity and magnetism and make use of these laws to derive Maxwell"s Electromagnetic wave equation and Poynting theorem. 16. Classify Magnetic Materials and explain properties, Identify applications of Ferro Magnetic Materials and Superconducting Materials. 17. Explain the principle of Laser and Optical Fiber; Summarize different types of Laser sources and optical fibers; identify the applications of Laser and Optical Fiber. 18. Re call the concept of ultrasonic waves and their applications. 19. Explain and illustrate Semiconducting materials along with their applications. 20. Summarize various types of Nanomaterials, their preparation methods and list out various Characterization Techniques and applications of Nanomaterials.

BSC 202: MATHEMATICS – II
Course Outcomes: After completion of the course, Students will be able to • solve system of linear equations and eigen value problems • solve certain first order and higher order differential equations • determine the analyticity of complex functions and expand functions as Taylor and Laurent series • evaluate complex and real integrals using residue theorem

ESE201: PROGRAMMING FOR PROBLEM SOLVING
Course Outcomes: After completion of the course, Students will be able to • Able to design algorithms for different problems • Able to write program for various problems. • Able to write program for matrix representation. • Able to perform file handling operations.

HSMC 201: ENGLISH

Course Outcomes:

After completion of the course, Students will be able to

11. Demonstrate the skill of reading to summarize, paraphrase and give an accurate account of authentic texts of various genres
12. Infer and make predictions based on the comprehension of a text
13. Employ Academic Vocabulary appropriately with a distinction of its formal and informal use
14. Apply different reading strategies to comprehend different texts and decode new words encountered
15. Undertake guided and extended writing using accurate grammatical structures and vocabulary

BSC 201: ENGINEERING PHYSICS LAB

Course Outcomes:

After completion of the course, Students will be able to

1. Analyze a Semiconducting device and determine its temperature Coefficient of Resistance, Energy Gap,
2. Determine the Wavelength of Laser source, Sodium Vapour lamp using diffraction grating.
3. Explain the principle of Optical Fiber and determine its Numerical Aperture, Acceptance angle and losses.
4. Determine the characteristics of Thermistor .
5. T o study the characteristics of junction diode.
6. To study Characteristics of the solar cell.

ESC 201 : PROGRAMMING FOR PROBLEM SOLVING LAB

Course Outcomes:

After completion of the course, Students will be able to

- To formulate the algorithms for simple problems
- To translate given algorithms to a working and correct program
- To correct syntax errors as reported by the compilers
- To identify and correct logical errors encountered at run time
- To write iterative as well as recursive programs
- To represent data in arrays, strings and structures and manipulate them through a program
- To declare pointers of different types and use them in defining self-referential structures.
- To create, read and write to and from simple text files

ESC 202 : WORKSHOP PRACTICE
1. Course Outcomes: 2. After completion of the course, Students will be able to 3. Fabricate components with their own hands. 4. Get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes. 5. Assembling different components, they will be able to produce small devices of their interest. 6. Apply basic electrical engineering knowledge for house wiring practice.

HSMC 201: English Lab
1. **Course Outcomes**: On successful completion of the course, the student will acquire the ability to: 2. To enable the students to 3. learn the sound systems of English 4. learn the word stress in English 5. learn the rhythm and intonation of English 6. improve their articulation skills and participation skills

Semester III

BS 303 MT : MATHEMATICS-III
Course Outcomes: After completion of the course, Students will be able to 1. Find solutions of the heat equation, wave equation, and the Laplace equation subject to boundary conditions. 2. Solve non linear equations, system of linear equations and differential equations numerically. 3. Perform numerical differentiation and numerical integration.

HS 901 MB : Managerial Economics and Accountancy
Course Outcomes: After completion of the course, Students will be able to 1. Apply the fundamental concepts of managerial economics to evaluate business decisions. 2. Understand types of demand and factors related to it. 3.Identify different types of markets and determine price-output under perfect competition. 4. Determine working capital requirement and payback period. 5. Analyze and interpret financial statements through ratios.

PC 301 EC- Electronic Devices and Circuits
Course Outcomes: After completion of the course, Students will be able to 1. Interpret the characteristics and apply diode models to analyze various applications of diodes 2. Identify the merits and demerits of various filters, formulate and design rectifier circuits with filters Calculate ripple factor, efficiency and % regulation of rectifier circuits. 3. Discriminate the BJT configurations to recognize appropriate transistor configuration for any given application and design the biasing circuits with good stability 4. Analyze, compare and design of BJT amplifiers with various biasing circuits 5. Distinguish the working principles of BJT and FET also between FET & MOSFET

PC 302 EC - Digital System Design
Course Outcomes: After completion of the course, Students will 1. Be able to manipulate numeric information in different forms, e.g. different bases, signed integers, various codes such as ASCII, Gray, and BCD. 2. Be able to manipulate simple Boolean expressions using the theorems and postulates of Boolean algebra and to minimize combinational functions. 3. Be able to design and analyse small combinational circuits and to use standard combinational functions/building blocks to build larger more complex circuits. 4. Be able to design and analyze small sequential circuits and devices and to use standard sequential functions/building blocks to build larger more complex circuits.

PC 303 EC - Signal Analysis and Transform Techniques
Course Outcomes: After completion of the course, Students will 1. Be able to describe signals mathematically and understand how to perform mathematical operations on signals. 2. Understand and resolve the signals in frequency domain using Fourier series and Fourier transforms. 3. Be able to compute the output of an LTI system given the input and impulse response through convolution sum and convolution integral 4. Understand the sampling theorem and the process of reconstructing a continuous

signal Random its samples
5. Be able to solve a linear constant coefficient difference equation using Z transform techniques

PC 304 EC - Network Analysis and Synthesis

Course Outcomes:

After completion of the course, Students will be

1. Able to Learn how to develop and employ circuit models for elementary electronic components and to adapt using various methods of circuit analysis, including simplified methods such as Series-parallel reductions, voltage and current dividers, superposition and Thevenin-Norton equivalent circuits etc.
2. Able to Analyze given Electrical Circuit in terms of A,B,C,D and Z,Y Parameter Model and Solve the circuits and how they are used in real time applications. Able to analyze the topologic description of networks. Ability to Solve Circuits using Tree, Node, Branch, Cutset, Tie Set Methods.
3. Able to analyze small RLC circuits Series and parallel Resonance of RC, RL and RLC circuits. Able to solve Transient Analysis.
4. Able to design different types of filters and Attenuator.
5. Able to synthesize the RL, RC & RLC networks Foster and Cauer Forms.

PC 351 EC Electronic Devices and Circuits Laboratory

Course Outcomes:

After completion of the course, Students will be able to

1. Understand characteristics of Diodes
2. Plot the characteristics of BJT in different configurations.
3. Record the parameters of BJT and FET amplifiers.
4. Understand biasing techniques of BJT.
5. Use the SPICE software for simulating electronic circuits.

PC 352 EC - Networks and Logic Design Laboratory

Course Outcomes:

After completion of the course, Students will

1. Able to analyze and verify Different Network theorems.
2. Able to understand two-port networks and resonance circuits
3. Able to calculate frequency response curves of LPF, HPF.
4. Able to understand and verify truth table of combinational circuits and sequential circuits.
5. Able to understand and verify counters and shift register.

Semester IV

PC 401 EC - Analog Electronic Circuits

Course Outcomes:

After completion of the course, Students will

1. Design and Analyze low frequency, mid frequency and high frequency response of small signal single stage and Multistage RC coupled and Transformer Amplifiers using BJT and FET.
2. Identify the type of negative feedback, Analyze and design of negative feedback amplifiers.
3. Design Audio Frequency and Radio Frequency oscillators
4. Distinguish between the classes of Power Amplifiers and their design considerations.
5. Compare the performance of single and double Tuned Amplifiers.

PC 402 EC - Probability Theory and Stochastic Processes

Course Outcomes:

After completion of the course, Students will

1. Able to solve using an appropriate sample space by the concepts of probabilities and understand multiple random variables, relate the same through examples to real problems.
2. Able to understand the usefulness of stochastic processes in their professional area.
3. Able to characterize the response of LTI systems driven by a stationary random process using autocorrelation and power spectral density functions.
4. Able to Application of these principles in areas where presence of noise is a serious challenge.

PC 403 EC - Electromagnetic Theory and Transmission Lines

Course Outcomes:

After completion of the course, Students will

1. Able to express and elaborate Maxwell's Equations in differential and integral forms and the constitutive relations between the flux densities and field intensities of the electrostatics, magneto-statics and electrodynamics fields.
2. Able to derive the Helmholtz wave equations in its various forms and the wave nature of their solutions for time-harmonic waves in various mediums.
3. Able to apply fundamental electromagnetic concepts in applications such as Transmission Lines and Antennas.

PC 404 EC - Pulse and Integrated Circuits

Course Outcomes:

After completion of the course, Students will be able to

1. Construct different linear networks and analyze their response to different input signals
2. Understand Analyze and design multi vibrators and sweep circuits using transistors.
3. Analyze DC and AC characteristics for Single/Dual input Balanced/Unbalanced

output configurations using BJTs.
4. Distinguish various linear and non-linear applications of Op-Amp.
5. Analyze the operation of the most commonly used D/A and A/D converter types.

BS 404 MT : MATHEMATICS-IV

Course Outcomes:

After completion of the course, Students will be able to

1. Learn vector spaces and linear transformations.
2. apply various probability distributions to solve practical problems, to estimate unknown parameters of populations and apply the tests of hypotheses
3. perform a regression analysis and to compute and interpret the coefficient of correlation

ES 404 ME - Elements of Mechanical Engineering

Course Outcomes:

After completion of the course, Students will be able to

1. Differentiate between heat and work transfers and relates them with enthalpy changes
2. Formulate various power cycles, represents them on p-V, T-S diagrams and also study their feasibility in practical applications
3. Understand the work saving methods in functioning of Compressors and refrigeration cycles
4. Design belt drives and gear drives and formulate methods for balancing of rotating masses
5. Demonstrate the working of various welding processes and gain knowledge of working of unconventional methods of manufacturing.

MC 201 EC - Environmental Science

Course Outcomes:

After completion of the course, Students will be able to

1. Rational utilization of natural resource can be expected.
2. Protection and conservation of ecosystems and biodiversity.
3. Development of New technologies for the abatement of pollution.
4. Mitigative techniques will come from the students.
5. Sustainability can be achieved.

PC 451 EC - Analog Electronic Circuits Laboratory

Course Outcomes:

After completion of the course, Students will be able to

1. Calculate gain and bandwidth of BJT, FET.
2. Study multivibrator circuits.
3. Study oscillator circuits.
4. Demonstrate filter circuits
5. Demonstrate power amplifier and Op-Amp Circuits

PC 452 EC - Pulse and Integrated Circuits Laboratory

Course Outcomes:

After completion of the course, Students will be able to

1. Design and analyze linear wave shaping circuits.
2. Design and analyze clipping and clamping circuits.
3. Design and analyze multivibrator circuits.
4. Design Op-AMP applications.
5. Effective use of 555 timer

Semester V

PC 501 EC : Linear Control Systems

Course Outcomes:

After completion of the course, Students will be able to

1. Able to develop mathematical models and derive transfer functions for various systems.
2. Able to expose to an appropriate statespace modeling of system and its analysis and the
3. concept and testing of controllability and observability.
4. Able to analyze the systems in time domain and determine its stability.
5. Able to analyze the systems in frequency domain and determine relative stability.
6. Able to design compensators for a given specifications.

PC 502 EC: ANALOG COMMUNICATION

Course Outcomes

1. Able to compare the performance of AM, FM and PM schemes with reference to bandwidth.
2. Able to understand generation of AM,FM,PM schemes.
3. Able to evaluate the performance of AM and FM transmitters and receivers.
4. Able to identify sources of noise, noise figure, signal to noise ratio for AM,FM, and PM.
5. Understand the concept of pulse modulation and to compare their performance

PC 503 EC : DIGITAL COMMUNICATION

Course Outcomes:

After completion of the course, Students will be able to

11. Able to acquires knowledge about information theory and assesses entropy and efficiency of various channels.
12. Able to learn to design an optimum receiver and analyze the error performance of base band and band pass data transmission.
3. Able to understand to design block codes, convolution and cyclic codes.
4. Able to apply suitable digital carrier modulation techniques and coding techniques for various applications for improved spectral efficiency.
5. Able to analyze the performance of spread spectrum communication system.

PC 504 EC : Microprocessor and Microcontroller

Course Outcomes:

After completion of the course, Students will be able to

1. Able to acquire an overview of what a processor and controller are and differentiate Between them.
2. Able to understand the architecture of a microprocessor and microcontroller to enable to design applications using them.
3. Able to apply theoretical learning to practical real time problems for automation.
4. Able to Program using assembly language instructions for any application of processors.
5. Able to analyze and design real world applications and interface peripheral devices to the microprocessor.

MANDATORY COURSE MC 501 HS : TECHNICAL COMMUNICATION AND SOFT SKILLS

Course Outcomes:

After completion of the course, Students will be able to

1. Effectively communicate through verbal/oral communication and through listening skills.
2. Write precise briefs or reports and technical documents.
3. Actively participate in group discussion/meetings/interviews, prepare & deliver presentations..
4. Become more effective individual through goal/target setting, self motivation and practicing creative thinking.
5. Function effectively in multi disciplinary and heterogeneous teams through knowledge of team work, inter personal relationships, conflict management and leadership quality

PROFESSIONAL ELECTIVE-I PE 502 EC ELECTRONIC MEASUREMENTS AND INSTRUMENTATION
Course Outcomes: After completion of the course, Students will be able to 1. Able to understand the various Standards of measurement. 2. Exposed to the operating principles of various transducers. 3. Able to learn about various methods of temperature and humidity measurement. 4. Able to understand the operation, featuresand applications of different types of Oscilloscope. 5. Able to learn about the various types of Biomedical Instruments.

PC 551 EC –ANALOG COMMUNICATION LABORATORY
Course Outcomes: After completion of the course, Students will be 1. Able to acquire knowledge of performing modulation and demodulation and analyze the affects of various parameters on the process. 2. Able to acquire knowledge of operation of various radio receiver sub systems. 3. Able to acquire in-depth understanding of pulse analog and pulse digital modulation techniques. 4. Able to acquire skill to perform carrier modulation schemes using MATLAB.

PC 552EC –MICROPROCESSOR AND MICROCONTROLLER LABORATORY
Course Outcomes: After completion of the course, Students will be 1. Able to write assembly language programs for arithmetic operations using 8086. 2. Able to implement simple programs on 8086. 3. Able to perform string manipulation operations in 8086. 4. Able to interface the 8086 to peripherals like stepper motor, ADC, DAC etc. 5. Able to understand the Keil IDE and simulate 8051 programs on it.

Semester VI

PC 601EC : DIGITAL SIGNAL PROCESSING
Course Outcomes Upon completion of the course, the students will be able to: 1. Able to find DFT of a given signal through Fast Fourier Transform techniques. 2. Able to design FIR and IIR type digital filters. 3. Able to identify filter structures and evaluate the coefficient quantization effects. 5. Able to understand sample rate conversion techniques. 6. Able to compare the architectures of DSP and General Purpose Processors.

PC 602 EC :ANTENNA WAVE PROPAGATION
Course Outcomes Upon completion of the course, the students will be able to: 1. Able to learn the basic antenna parameters, antenna radiation concepts and will be able to analyze the linear antennas. 2. Able to classify, analyze and design the antenna arrays and explain various antennas in VHF and UHF range. 3. Able to attains engineering fundamentals to analzse and design antenna arrays 4. Able to identify and explain different modes of propagation in different regions of atmosphere..

PC 603 EC : DATA COMMUNICATION AND COMPUTER NETWORKS
Course Outcomes Upon completion of the course, the students will be: 1. Able to understand the fundamentals of networks and issues involved. 2. Able to categorize services offered by all layers in TCP/IP protocol stack. 3. Able to analyze a network under congestion and propose solutions for reliable data transfer. 4. Able to identify the issues and challenges in the architecture of a computer network.

PROFESSIONAL ELECTIVE-II PE 603 EC –INFORMATION THEORY AND CODING
Course Outcomes: After completion of the course, Students will be able to 1. Learn measurement of information and errors. 2. Design encoders and decoders for linear block codes 3. Apply cyclic codes for error correction and detection 4. Design encoders and decoders for convolution codes 5. Understand encoders and decoders for BCH codes

OPEN ELECTIVE-I OE 602EC-VERILOG HDL
Course Outcomes Upon completion of the course, the students will be able to: 1. Able to implement and distinguish different Verilog HDL modeling styles.

2. Able to construct and analyze Verilog HDL models of combinational and sequential circuits.
3. Able to design and develop Verilog HDL modeling and test bench for digital systems for the given specifications.
4. Able to outline FPGA design flow and timing analysis.
5. Able to described the concept of real time implementation

HS 601 MB : FUNDAMENTALS OF MANAGEMENT

Course Outcomes

Upon completion of the course, the students will be able to:

1. implement and debug programs in C language
2. select appropriate data type to develop programs
3. apply repetition control statements, single and multiple selection statements, to write programs implement modular programming solutions to problems
4. Demonstrate the use of pointers for dynamic memory management.
5. Implement functions and recursive functions in C
6. Implement searching and sorting techniques.

PC 651 EC: DIGITAL SIGNAL PROCESSING LABORATORY

Course Outcomes:

After completion of the course, Students will be able to

1. Able to develop various DSP Algorithms using MATLAB Software package.
2. Able to analyze and Observe Magnitude and phase characteristics (Frequency response
3. Characteristics) of digital FIR filter using window techniques.
4. Able to analyze and Observe Magnitude and phase characteristics (Frequency response (Characteristics) of digital IIR-Butterworth, Chebyshev filters.
5. Able to design and Implement DSP algorithms insoftware using a computer language such as C with TMS320C54x fixed point Processor

PC 652 EC: DIGITAL COMMUNICATON LABORATORY

Course Outcomes:

After completion of the course, Students will be able to

1. Able to acquire knowledge of for forming modulation and demodulation and analyze the effects of various parameters on the process.
2. Able to acquire in-depth understanding of pulse digital modulation techniques
3. Able to acquire skill to perform carrier miodulation schemes using MATLAB

Semester VII

PC 701 EC MICROWAVE TECHNIQUES
Course Outcomes After completion of the course, Students will be 1. Able to understand electromagnetic wave propagation in parallel plane waveguides. 2. Able to understand electromagnetic wave propagation in rectangular waveguides and resonators. 3. Able to understand the formulation of Scattering Matrix and define them for various microwave components. 4. Able to learn principle of operation and applications of specialized microwave vacuum tubes. 5. Able to distinguish between transfer electron devices from ordinary low frequency semiconductor devices and learn basic modes of operation of Gunn Diode and its applications

PC 702EC VLSI DESIGN
Course Outcomes After completion of the course, Students will be able to 1.Have an understanding of the Fabrication processes and the comparison between different state-of-the-art CMOS technologies. 2. Acquire the knowledge in understanding CMOS Inverter characteristics. Illustrate circuit diagrams, stick diagrams and layouts. 3. DesignandanalyzevariousCombinationalLogiccircuitsindifferentmodels. 4. Design and analyze various Arithmetic Blocks and Memory structures 5. Synthesize a digital system to meet design specifications of the system.

PC 703 EC MOBILE COMMUNICATION
Course Outcomes Upon completion of the course, students will be able to: 1. Able to analyze the various operational features of Mobile Communication Systems 2. Able to deal with the Mobile communication system designs of Frequency re-use and Interference Factors 3. Able to carry out the Design aspects of Mobile signal coverage over different terrains 4. Able to analyze the different Cell-site and Mobile antennas for different applications

5. Able to characterize the Handoffs mechanisms.

PROFESSIONAL ELECTIVE-III PE 704
EC EMBEDDED SYSTEM DESIGN

Course Outcomes

After completion of the course, Students will be able to

1. Design an embeddedsystem.
2. Distinguish between RISC andCISC
3. Use the ARM Cortex for design of embeddedsystem
4. Use Embedded Software Development Tools for Designing Embedded System applications
5. Apply their understanding in building real timesystems.

PROFESSIONAL ELECTIVE-IV
PE 708 EC RADAR SYSTEMS

Course Outcomes

After completion of the course, Students will be

1. Able to understand the components of a radar system.
2. Able to demonstrate the function of FMCW radar.
13. Able to analyze the concept of MTI radar systems.
14. Able to incorporate the effects of environment condition in a radar system.
15. Able to apply appropriate mathematical and computer models relevant to radar systems to calculate system performance.

OPEN ELECTIVE-II
OE 715 EC INDUSTRIAL ADMINISTRATION &FINANCIAL MANAGEMENT

Course Outcomes

After completion of the course, Students will be able to

1. Understand business forms, organization structures and plant layouts.
2. Implementation of method study and estimation of standard time.
3. Understand types of production, functions of PPC, quality control by charts and sampling.
4. Implement optimization techniques like LPP, assignment and project management techniques.
5. Understand BEA, estimation of depreciation, selling price of a product and capital budgeting techniques.

PC 751 EC MICROWAVE LABORATORY
To enable the students to communicate clearly & accurately 1. Understand the characteristics of RKO and Gunn oscillator. 2. Measurement of frequency and wavelengths would be learnt by the student. 3. VSWR various TEES would be understood by the student. 4. Radiation pattern would be learnt by the student for horn antenna. 5. How to Create, Simulate and Analyze the different types of Micro strip Antennas by using EM simulation software.

PC 752 EC ELECTRONIC DESIGN AND AUTOMATION LABORATORY
To enable the students to communicate clearly & accurately 1. Able to achieve knowledge of Verilog HDL programming. 2. Able to write programs in HDL at various levels of abstraction. 3. Achieve knowledge of working with back end tools of VLSI. 4. Able to develop models for basic designs using back end tools. 5. Able to understand, formulate and develop models for various designs using HDL and back end tools.

PW 761 ECPROJECT STAGE - 1
Course Outcomes Upon completion of the course, the students will be able to: 1.demonstratetheabilitytosynthesizeandapplytheknowledgeandskillsacquiredintheacademicprogramtoreal-worldproblems 2.evaluatedifferentsolutionsbasedoneconomicandtechnicalfeasibility 3.effectivelyplanaprojectandconfidentlyperformallaspectsofprojectmanagement 4.Demonstrateeffectivewrittenandoralcommunicationskills

PW 762 EC : SELF STUDY PROJECT
Course Outcomes Upon completion of the course, the students will be able to: 1. Use of library, literature review 2. Hunting/ Understanding the problem of social relevance / practical importance 3. Learn data analysis/ synthesis 4. Learn to choose right path/ optimum solutions 5. Learn presentation (Oral/technical/professional writing skills)

PC 653 EC: SUMMER INTERNSHIP

Course Outcomes

Upon completion of the course, the students will be able to:

1. Use of library, literature review
2. Hunting/ Understanding the problem of social relevance / practical importance
3. Learn data analysis/ synthesis
4. Learn to choose right path/ optimum solutions
5. Learn presentation (Oral/technical/professional writing skills)

Semester VIII

(Professional Elective - V)

PE 801 EC OPTICAL COMMUNICATIONS

Course Outcomes

After completion of the course, Students will be

1. Able to apply Optical Laws to provide solutions to the problems of Optical Waveguides
2. Able to deal with the Optical Communication System designs.
3. Able to carry out the calculations of various noise powers at Optical Receivers
4. Able to design the Optical Link Power Budget and Rise Time Budget for the given applications
5. Able to design the WDM systems with various system considerations

(Professional Elective - VI)

PE 805 EC WIRELESS SENSOR NETWORKS

Course Outcomes

After completion of the course, Students will be able

1. To understand the state-of-the-art in network protocols, architectures and applications
2. To Explain the Fundamental Concepts and applications of ad hoc and wireless sensor networks
3. To Describe the MAC protocol issues of Adhoc and sensor networks
4. To Discuss the WSN routing issues by considering QoS measurements
5. To understand the state-of-the-art techniques and protocols in QoS and Energy management for wireless sensor networks.

(Open Elective –III)

OE 804 EC GLOBAL AND REGIONAL SATELLITE NAVIGATION SYSTEM

Course Outcomes

After completion of the course, Students will be

1. Able to understand the principle and operation of GPS.
2. Able to understand the GPS Signal structure and services.
3. Able to understand about various errors.
4. Able to use of GPS in various fields such as navigation, GIS etc.
5. Able to understand principle of Operation of various GRNSS.

PW 861 ECPROJECT STAGE - II

Course Outcomes

Student will be able to

1. Demonstrate the ability to synthesize and apply the knowledge and skills acquired in the academic program to real-world problems
2. Evaluate different solutions based on economic and technical feasibility
3. Effectively plan a project and confidently perform all aspects of project management
4. Demonstrate effective written and oral communication skills

PW 862 ECSELF STUDY PROJECT

Course Outcomes

Student will be able to

1. Use of library, literature review
2. Hunting/ Understanding the problem of social relevance / practical importance
3. Learn data analysis/ synthesis
4. Learn to choose right path/ optimum solutions
5. Learn presentation (Oral/technical/professional writing skills)