
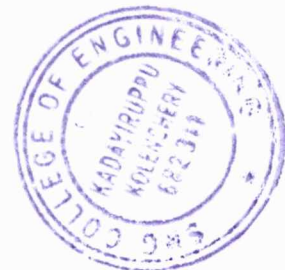


List and description of courses addressing cross cutting issues
Course contents relating to Gender

Sl. No	Course code	Courses	Description
1	HS210	LIFE SKILLS	Equal priority for Improved problem-solving skills: Lifelong learning helps engineers develop the critical thinking and problem-solving skills they need to succeed in their careers.
2	HUN101	LIFE SKILL	Equal priority to Enhanced creativity: Lifelong learning helps engineers think outside the box and come up with new and innovative solutions to problems
3	HUN102	PROFESSIONAL COMMUNICATION	Irrespective of gender students can communicate effectively with clients, understand their needs and expectations, and translate technical concepts into understandable language. Clear and concise communication fosters trust, enhances client satisfaction, and leads to successful project outcomes.
4	EST102	PROGRAMMING IN C	Irrespective of gender they can code the different programs.
5	BE 102	DESIGN ENGINEERING	Irrespective of gender they can apply scientific knowledge to the solution of technical problems.
6	HUN101	LIFE SKILLS	Equal priority for Improved problem-solving skills: Lifelong learning helps engineers develop the critical thinking and problem-solving skills they need to succeed in their careers.
7	HUN102	PROFESSIONAL COMMUNICATION	Irrespective of gender students can communicate effectively with clients, understand their needs and expectations, and translate technical concepts into understandable language. Clear and concise communication fosters trust, enhances client satisfaction, and leads to successful project outcomes.
8	EST102	PROGRAMMING IN C	Irrespective of gender they can code the different programs.
9	BE102	DESIGN & ENGINEERING	Irrespective of gender they can apply scientific knowledge to the solution of technical problems.


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List and description of courses addressing cross cutting issues
Course contents relating to Gender

Sl. No	Course code	Courses	Description
10	HS210	LIFE SKILLS	Equal priority to Enhanced creativity: Lifelong learning helps engineers think outside the box and come up with new and innovative solutions to problems
11	EST 200	DESIGN & ENGINEERING	Irrespective of gender they can apply scientific knowledge to the solution of technical problems.
12	MCN 202	CONSTITUTION OF INDIA	Incorporates gender equality through various acts and sections of the Indian Constitution
13	HS 210	LIFE SKILL	Equal priority for Improved problem-solving skills: Lifelong learning helps engineers develop the critical thinking and problem-solving skills they need to succeed in their careers.
14	HS200	BUSINESS ECONOMICS	
15	MCN202	CONSTITUTION OF INDIA	Incorporates gender equality through various acts and sections of the Indian Constitution
16	EST200	DESIGN & ENGINEERING	Irrespective of gender they can apply scientific knowledge to the solution of technical problems.
17	MCN202	CONSTITUTION OF INDIA	Incorporates gender equality through various acts and sections of the Indian Constitution
18	HS211	LIFE SKILLS	Equal priority to Enhanced creativity: Lifelong learning helps engineers think outside the box and come up with new and innovative solutions to problems
19	CS 234	DIGITAL SYSTEMS LAB	Irrespective of gender they can design the different circuits.
20	CSL 202	DIGITAL LAB	Irrespective of gender they can design the different circuits.
21	20MCA246	MAIN PROJECT	Gives equal priority for all genders in designing and implementing their projects and preparing the report.
22	20MCA245	MINI PROJECT	Gives equal priority for all genders in designing and implementing their projects and preparing the report.
23	20MCA244	SEMINAR	Gives equal priority for all genders in presenting and preparing the report.

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List and description of courses addressing cross cutting issues
Course contents relating to Gender

Sl. No	Course code	Courses	Description
24	CE 431	DESIGN PROJECT	Irrespective of gender they can apply scientific knowledge to the solution of technical problems.
25	HS 300	PRINCIPLES OF MANAGEMENT	Irrespective of gender managers can focus on optimum use of available resources so as to achieve productive results at minimum cost and maximum profits.
26	HUT 300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	Gender equality goes hand-in-hand with macroeconomic and financial stability, can stimulate economic growth, boost private and public sector performance, and reduce income inequality.
27	EE341	DESIGN PROJECT	Irrespective of gender they can apply scientific knowledge to the solution of technical problems.
28	HS300	PRINCIPLES OF MANAGEMENT	Irrespective of gender managers can focus on optimum use of available resources so as to achieve productive results at minimum cost and maximum profits.
29	HUT300	INDUSTRIAL ECONOMIC & FOREIGN TRADE	Gender equality goes hand-in-hand with macroeconomic and financial stability, can stimulate economic growth, boost private and public sector performance, and reduce income inequality.
30	HUT310	MANAGEMENT FOR ENGINEERS	Irrespective of gender they can planning and coordinating projects, supervising teams, and researching new products. They develop strategies, manage budgets, and ensure successful project execution. They work closely with teams and collaborate with other management personnel.
31	EET322	RENEWABLE ENERGY SYSTEMS	Irrespective of gender they learn to preserving the environment
32	HUT300	INDUSTRIAL ECONOMICS AND FOREIGN TRADE	Gender equality goes hand-in-hand with macroeconomic and financial stability, can stimulate economic growth, boost private and public sector performance, and reduce income inequality.
33	HUT301	MANAGEMENT FOR ENGINEERS	Irrespective of gender they can planning and coordinating projects, supervising teams, and researching new products. They develop strategies, manage budgets, and ensure successful project execution. They work closely with teams and collaborate with other management personnel.
34	ECD334	MINIPROJECT	Gives equal priority for all genders in designing and implementing their projects and preparing the report.
35	EC010606L04	PROJECT	Gives equal priority for all genders in designing and implementing their projects and preparing the report.
36	BT362	SUSTAINABLE ENERGY PROCESS	Irrespective of gender the course aim to create a better world, which is done by considering the well-being of both people and the planet
37	HS300	PRINCIPLES OF MANAGEMENT	Irrespective of gender managers can focus on optimum use of available resources so as to achieve productive results at minimum cost and maximum profits.

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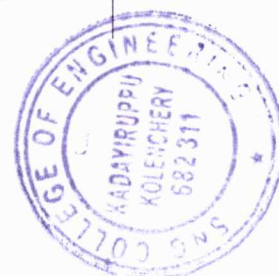


List and description of courses addressing cross cutting issues
Course contents relating to Gender

Sl. No	Course code	Courses	Description
38	MCN301	DISASTER MANAGEMENT	Subject gives an insight into the importance of gender equality during crisis management.
39	SB341	DESIGN PROJECT	Equal priority for all gender to apply scientific knowledge to the solution of technical problems
40	HUT310	MANAGEMENT FOR ENGINEERS	Irrespective of gender they can planning and coordinating projects, supervising teams, and researching new products. They develop strategies, manage budgets, and ensure successful project execution. They work closely with teams and collaborate with other management personnel.
41	SBT308	COMPREHENSIVE COURSE WORK	Gives equal priority for all gender to express their learning skills.
42	SB352	COMPREHENSIVE EXAM	Gives equal priority for all gender to express their learning skills.
43	CSD 334	MINI PROJECT	Gives equal priority for all gender in designing and implementing their projects and preparing the report.
44	RLMCA352	PROJECT AND VIVA VOCE	Gives equal priority for all gender in designing and implementing their projects and preparing the report.
45	RLMCA341	SEMINAR	Gives equal priority for all gender in presenting and preparing the report.
46	RLMCA351	MINI PROJECT	Gives equal priority for all gender in designing and implementing their projects and preparing the report.
47	RLMCA303	E-COMMERCE	
48	CE451	SEMINAR & PROJECT PRELIMINARY	Gives equal priority for all gender in designing and implementing their projects and preparing the report.
49	CE 492	PROJECT	Gives equal priority for all gender in designing and implementing their projects and preparing the report.
50	CED413	SEMINAR	Gives equal priority for all gender in designing and implementing their projects and preparing the report.
51	CED415	PROJECT PHASE I	Gives equal priority for all gender in designing and implementing their projects and preparing the report.

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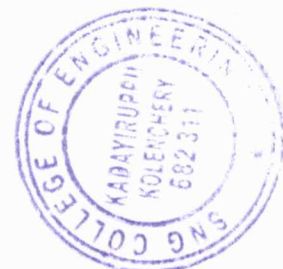


List and description of courses addressing cross cutting issues
Course contents relating to Gender

Sl. No	Course code	Courses	Description
52	CED416	PROJECT PHASE II	Gives equal priority for all gender in designing and implementing their projects and preparing the report.
53	EE492	PROJECT	Gives equal priority for all gender in designing and implementing their projects and preparing the report.
54	EE474	ENERGY MANAGEMENT AND AUDITING	Gives equal priority for all gender to assists facilities in demand response processes where energy consumption is adjusted based on grid demand to maintain system stability and lower costs. i
55	EST200	DESIGN ENGINEERING	Irrespective of gender they can apply scientific knowledge to the solution of technical problems.
56	ECD416	PROJECT PHASE II	Gives equal priority for all gender in designing and implementing their projects and preparing the report.
57	SBT404	COMPREHENSIVE COURSE VIVA	Gives equal priority for all gender to express their learning skills.
58	CE488	DISASTER MANAGEMENT	Subject gives an insight into the importance of gender equality during crisis management.
59	CE482	ENVIRONMENTAL IMPACT ASSESSMENT	Irrespective of gender course ensures that the potential problems are foreseen and addressed at an early stage in project planning and design.
60	CS010 710	PROJECT WORK	Gives equal priority for all gender in designing and implementing their projects and preparing the report.
61	CS 451	SEMINAR & PROJECT PRILIMINARY	Gives equal priority for all gender in designing and implementing their projects ,presenting and preparing the report.
62	CS010 807	PROJECT WORK	Gives equal priority for all gender in designing and implementing their projects and preparing the report.

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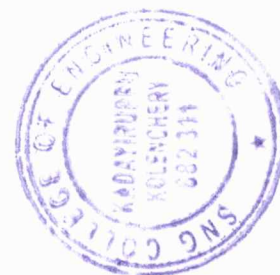


List and description of courses addressing cross cutting issues

Course contents relating to Professional Ethics

Sl. No.	Course Code	Course Name	Discription
1	HUN 102	PROFESSIONAL COMMUNICATION	Students communication, needs to reflect their ethics. Honesty should be the cornerstone of all our workplace communications. Honesty builds trust between us and authority figures, as well as between colleagues and clients. Course helps students to confidently communicate ethically in their workplace and society.
2	HUN101	LIFE SKILL	Develops communication competence in prospective engineers and enables them to convey thoughts and ideas with clarity and focus
3	BE 102	DESIGN ENGINEERING	Design Engineering course gives the student the basic knowledge about ethics to be practiced in profession.
4	BE103	INTRODUCTION TO SUSTAINABLE ENGINEERING	It gives an idea about the potential of technology in bringing in sustainable practices
5	CS 100	COMPUTER PROGRAMMING	By gaining the knowledge of programming skills, students will be able to develop real time applications with better quality and reliability which meets the specific needs of the public.
6	EST 102	PROGRAMMING IN C	By gaining the knowledge of programming skills, students will be able to develop real time applications with better quality and reliability which meets the specific needs of the public.
7	20MCA107	ADVANCED SOFTWARE ENGINEERING	Software engineering ethics studies the interactions of human values and technical decisions involving computing. It establishes principles of conduct that members of the profession are expected to observe in the practice of software engineering.
8	20MCA102	ADVANCED DATABASE MANAGEMENT SYSTEMS	The students will be able to perform database transactions satisfying database integrity without violating user permissions and not causing harm to the data in the database. The students will be aware that the database operations must satisfy consistency and security of the data.
9	20MCA104	ADVANCED COMPUTER NETWORKS	Students learn the importance of development of Client-Server based an application that reduces consumption of public internet network bandwidth as part of Ethics. Also students learn about IPV4 addressing and importance of migration to IPV6 addressing scheme which is a solution for sustainability of future networks
10	20MCA192	IPR AND CYBER LAWS	Course gives insight on Intellectual property rights, that are the rights given to each and every person for the creation of new things according to their minds. IPR usually give the creator a complete right over the use of his/her creation for a certain period of time. It helps students to understand the ethics to be followed in the field of IPR and cyber world
11	RLMCA102	OBJECT ORIENTED PROGRAMMING	Java was developed with security, reliability and confidentiality in mind. Gaining unauthorized access to system resources will expose the private information of the user such as credit card numbers bank account balances and passwords. The most innovative aspect of Java is user can safely download and execute applet program without causing any harm to one's system and security will not be breached.


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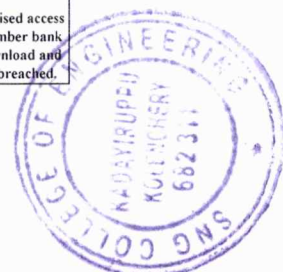


List and description of courses addressing cross cutting issues

Course contents relating to Professional Ethics

Sl. No.	Course Code	Course Name	Discription
12	HS 200	BUSINESS ECONOMICS	Economic ethics attempts to incorporate morality and cultural value qualities to account for the limitation of economics, which is that human decision making is not restricted to rationality. This understanding of culture unites economics and ethics as a complete theory of human action.
13	HS210	LIFE SKILLS	Develops communication competence in prospective engineers and enables them to convey thoughts and ideas with clarity and focus
14	EST 200	DESIGN & ENGINEERING	Design Engineering course gives the student the basic knowledge about ethics to be practiced in profession.
15	HUT 200	PROFESSIONAL ETHICS	Enables Students to create awarness on Ethics and human values
16	MCN 202	CONSTITUTION OF INDIA	A study of Indian constitution, imbibes in students a feeling of nationality, ethics and human rights. It gives the knowledge to students to face the society in a true sense of ethical values
17	HUT 200	PROFESSIONAL ETHICS	Enables Students to create awarness on Ethics and human values.
18	HS 210	LIFE SKILL	Develops communication competence in prospective engineers and enables them to convey thoughts and ideas with clarity and focus
19	HUT200	PROFESSIONAL ETHICS	Enables Students to create awarness on Ethics and human values
20	MCN201	SUSTAINABLE ENGINEERING	It gives an idea about the potential of technology in bringing in sustainable practices
21	MCN202	CONSTITUTION OF INDIA	A study of Indian constitution, imbibes in students a feeling of nationality, ethics and human rights. It gives the knowledge to students to face the society in a true sense of ethical values
22	CS 203	SWITCHING THEORY AND LOGIC DESIGN	Circuits designed based on norms and protocol must focus on betterment of mankind.
23	CS010 305	SWITCHING THEORY AND LOGIC DESIGN	Circuits designed based on norms and protocol must focus on betterment of mankind.
24	CS 206	OBJECT ORIENTD DESIGN AND PROGRAMMING	JAVA was developed with security, reliability and confidentiality in mind.Gaining unauthorised access to to system resources will expose the private information to the user such as credit card number bank account balances and passwords.The most innovative aspect of JAVA is user can safely download and execute applet programs without causing any harm to one's system and security will not be breached.

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List and description of courses addressing cross cutting issues

Course contents relating to Professional Ethics

Sl. No.	Course Code	Course Name	Discription
25	CST 281	OBJECT ORIENTED PROGRAMMING	Object oriented programming language like java is developed with security, reliability and confidentiality in mind. Gaining unauthorised access to system resources will expose the private information to the user such as credit card number bank account balances and passwords. The most innovative aspect of JAVA is user can safely download and execute applet programs without causing any harm to one's system and security will not be breached.
26	CST 205	OBJECT ORIENTED PROGRAMMING USING JAVA	JAVA was developed with security, reliability and confidentiality in mind. Gaining unauthorised access to system resources will expose the private information to the user such as credit card number bank account balances and passwords. The most innovative aspect of JAVA is user can safely download and execute applet programs without causing any harm to one's system and security will not be breached.
27	CS 208	PRINCIPLES OF DATABASE DESIGN	The students will be able to perform database transactions satisfying database integrity without violating user permissions and not causing harm to the data in the database. The students will be aware that the database operations must satisfy consistency and security of the data.
28	CST 204	DATABASE MANAGEMENT SYSTEMS	The students will be able to perform database transactions satisfying database integrity without violating user permissions and not causing harm to the data in the database. The students will be aware that the database operations must satisfy consistency and security of the data.
29	EST 200	DESIGN ENGINEERING	Design engineering course gives the student basic knowledge about ethics to be practiced in the profession.
30	RLMCA201	COMPUTER NETWORKS	Students learn the importance of development of Client-Server based an application that reduces consumption of public internet network bandwidth as part of Ethics. Also students learn about IPV4 addressing and importance of migration to IPV6 addressing scheme which is a solution for sustainability of future networks
31	RLMCA203	SOFTWARE ENGINEERING	Software engineering ethics studies the interactions of human values and technical decisions involving computing. It establishes principles of conduct that members of the profession are expected to observe in the practice of software engineering
32	RLMCA205	DATABASE MANAGEMENT SYSTEMS	The students will be able to perform database transactions satisfying database integrity without violating user permissions and not causing harm to the data in the database. The students will be aware that the database operations must satisfy consistency and security of the data.
33	RLMCA207	DESIGN AND ANALYSIS OF ALGORITHMS	Over the course of a generation, algorithms have gone from mathematical abstractions to powerful mediators of daily life. At the same time, complex algorithms are increasingly violating the basic rights of individual citizens. The Ethical Algorithm offers a new approach: a set of principled solutions based on the emerging and exciting science of socially aware algorithm design.
34	20MCA263	CYBER SECURITY & CRYPTOGRAPHY	The state of security on the Internet is bad and becoming worse. One reaction to this state of affairs is a behavior termed "Ethical Hacking" which attempts to proactively increase security protection by identifying and patching known security vulnerabilities on systems owned by other parties.
35	20MCA245	MINI PROJECT	Students should evaluate the credibility of resource available in library database and incorporate appropriate resources effectively and ethically to compare alternative solutions which address the problem. They must be able to understand the importance of ethical and social responsibility in application of specialized knowledge, design processes and documentation.
36	20MCA244	SEMINAR	Students should evaluate the credibility of the resources available in library databases and incorporate appropriate resources effectively and ethically to compare alternative solutions which address the problem. They must be able to understand the importance of ethical and social responsibility in application of specialized knowledge, design processes and documentation.
37	20MCA246	MAIN PROJECT	Students should evaluate the credibility of resource available in library database and incorporate appropriate resources effectively and ethically to compare alternative solutions which address the problem. They must be able to understand the importance of ethical and social responsibility in application of specialized knowledge, design processes and documentation.

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List and description of courses addressing cross cutting issues

Course contents relating to Professional Ethics

Sl. No.	Course Code	Course Name	Discription
38	20MCA267	CYBER FORENSICS	The state of security on the Internet is bad and becoming worse. One reaction to this state of affairs is a behavior termed "Ethical Hacking" which attempts to proactively increase security protection by identifying and patching known security vulnerabilities on systems owned by other parties.
39	CE 431	DESIGN PROJECT	Students should evaluate the credibility of resource available in library database and incorporate appropriate resources effectively and ethically to compare alternative solutions which address the problem. They must be able to understand the importance of ethical and social responsibility in application of specialized knowledge, design processes and documentation.
40	EE341	DESIGN PROJECT	Students should evaluate the credibility of resource available in library database and incorporate appropriate resources effectively and ethically to compare alternative solutions which address the problem. They must be able to understand the importance of ethical and social responsibility in application of specialized knowledge, design processes and documentation.
41	HUT300	INDUSTRIAL ECONOMIC & FOREIGN TRADE	Economic ethics attempts to incorporate morality and cultural value qualities to account for the limitation of economics, which is that human decision making is not restricted to rationality. Foreign trade enlarges the market for a country's output. Exports may lead to increase in national output and may become an engine of growth. Expansion of a country's foreign trade may energise an otherwise stagnant economy and may lead it onto the path of economic growth and prosperity.
42	HUT310	MANAGEMENT FOR ENGINEERS	. Management ethics involves leaders protecting their employees, customers and society as a whole from any negative consequences that could arise from the actions of their businesses
43	MCN 301	DISASTER MANAGEMENT	Subject gives an insight into the importance of humanitarian help during a crisis
44	EET322	RENEWABLE ENERGY SYSTEMS	The transition to renewable energy sources must be done in an equitable manner that does not disproportionately harm marginalized communities. For example: The construction of wind turbines or solar panels should not result in the displacement or harm of indigenous peoples or low-income communities
45	BT362	SUSTAINABLE ENERGY PROCESS	It gives an idea about the potential of technology in bringing in sustainable practices
46	SB341	DESIGN PROJECT	Students should evaluate the credibility of resource available in library database and incorporate appropriate resources effectively and ethically to compare alternative solutions which address the problem. They must be able to understand the importance of ethical and social responsibility in application of specialized knowledge, design processes and documentation.
47	CSD 334	MINI PROJECT	Students should evaluate the credibility of resource available in library database and incorporate appropriate resources effectively and ethically to compare alternative solutions which address the problem. They must be able to understand the importance of ethical and social responsibility in application of specialized knowledge, design processes and documentation.
48	CS010 503	DATABASE MANAGEMENT SYSTEMS	The students will be able to create and use database satisfying database integrity without violating user permission and not causing harm to the data in the database. The students will be aware that the database operations must satisfy consistency and security of data.
49	CS010 604	COMPUTER NETWORKS	Students learn the importance of development of client server based architecture for common network communication rather than designing a peer to peer application that consumes a lot of public internet network band width. So it maps to ethics. Also students can learn about IPv4 addressing and importance of migrations to IPv6 addressing even if it involves costs in terms of technology and man power. So it maps to sustainability also.
50	CS 306	COMPUTER NETWORKS	Students learn the importance of development of client server based architecture for common network communication rather than designing a peer to peer application that consumes a lot of public internet network band width. So it maps to ethics. Also students can learn about IPv4 addressing and importance of migrations to IPv6 addressing even if it involves costs in terms of technology and man power. So it maps to sustainability also.
51	CST 303	COMPUTER NETWORKS	Students learn the importance of development of client server based architecture for common network communication rather than designing a peer to peer application that consumes a lot of public internet network band width. So it maps to ethics. Also students can learn about IPv4 addressing and importance of migrations to IPv6 addressing even if it involves costs in terms of technology and man power. So it maps to sustainability also.

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List and description of courses addressing cross cutting issues

Course contents relating to Professional Ethics

Sl. No.	Course Code	Course Name	Discription
52	CS010 605	SOFTWARE ENGINEERING	Software engineering ethics studies the interation of human values and technical decisions involving computing. It establishes principles of context that members of the profession are expected ro observe in the practice of software engineering.
53	CS308	SOFTWARE ENGINEERING AND PROJECT MANAGEMENT	Software engineering ethics studies the interation of human values and technical decisions involving computing. It establishes principles of context that members of the profession are expected ro observe in the practice of software engineering.
54	CST 309	MANAGEMENT OF SOFTWARE SYSTEMS	Software engineering ethics studies the interactions of human values and technical decisions involving computing. It establishes principles of conduct that members of the profession are expected to observe in the practice of software engineering.
55	CST 304	COMPUTER GRAPHICS AND IMAGE PROCESSING	Image processing helps to develop various models which are used to solve a verity of problems in health ,weather forecast etc which are very cost and time effective.
56	CS010 601	DESIGN AND ANALYSIS OF ALGORITHM	Over the course of a generation, algorithms have gone from mathematical abstractions to powerful mediators of daily life. At the same time, complex algorithms are increasingly violating the basic rights of individual citizens. The Ethical Algorithm offers a new approach: a set of principled solutions based on the emerging and exciting science of socially aware algorithm design.
57	CS302	DESIGN AND ANALYSIS OF ALGORITHM	Over the course of a generation, algorithms have gone from mathematical abstractions to powerful mediators of daily life. At the same time, complex algorithms are increasingly violating the basic rights of individual citizens. The Ethical Algorithm offers a new approach: a set of principled solutions based on the emerging and exciting science of socially aware algorithm design.
58	CS403	PROGRAMMING PARADIGMS	The syllabus provides the foundation for structuring and validating programs. using type systems or more advanced forms of specification. For the theoretically minded it will provide the foundation for understanding the close relationship between specification and programs on one hand and mathematical conjecture and proof on the other. And the students get an idea, how to select good programming design which assures professional ethics.
59	RLMCA352	PROJECT AND VIVA VOCE	Students should evaluate the credibility of the resources available in library databases and incorporate appropriate resources effectively and ethically to compare alternative solutions which address the problem. They must be able to undersatnd the importance of ethical and social responsibility in application of specialized knowledge, design processes and documentation.
60	RLMCA341	SEMINAR	Students should evaluate the credibility of the resources available in library databases and incorporate appropriate resources effectively and ethically to compare alternative solutions which address the problem. They must be able to understand the importance of ethical and social responsibility in application of specialized knowledge, design processes and documentation
61	RLMCA351	MINI PROJECT	Students should evaluate the credibility of the resources available in library databases and incorporate appropriate resources effectively and ethically to compare alternative solutions which address the problem. They must be able to undersatnd the importance of ethical and social responsibility in application of specialized knowledge, design processes and documentation.
62	RLMCA 305	CRYPTOGRAPHY AND CYBER SECURITY	The state of security on the Internet is bad and becoming worse. One reaction to this state of affairs is a behavior termed "Ethical Hacking" which attempts to proactively increase security protection by identifying and patching known security vulnerabilities on systems owned by other parties.
63	CE 451	SEMINAR & PROJECT PRELIMINARY	Students should evaluate the credibility of the resources available in library databases and incorporate appropriate resources effectively and ethically to compare alternative solutions which address the problem. They must be able to understand the importance of ethical and social responsibility in application of specialized knowledge, design processes and documentation.
64	CE 492	PROJECT	Infer the importance of ethical and social responsibility in application of specialized knowledge, design processes and documentation.
65	CED413	SEMINAR	Students should evaluate the credibility of the resources available in library databases and incorporate appropriate resources effectively and ethically to compare alternative solutions which address the problem. They must be able to understand the importance of ethical and social responsibility in application of specialized knowledge, design processes and documentation.



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List and description of courses addressing cross cutting issues

Course contents relating to Professional Ethics


Sl. No.	Course Code	Course Name	Description
66	CED415	PROJECT PHASE I	Students should evaluate the credibility of the resources available in library databases and incorporate appropriate resources effectively and ethically to compare alternative solutions which address the problem. They must be able to understand the importance of ethical and social responsibility in application of specialized knowledge, design processes and documentation.
67	CED416	PROJECT PHASE II	Students should evaluate the credibility of the resources available in library databases and incorporate appropriate resources effectively and ethically to compare alternative solutions which address the problem. They must be able to understand the importance of ethical and social responsibility in application of specialized knowledge, design processes and documentation.
68	EE492	PROJECT	Students should evaluate the credibility of the resources available in library databases and incorporate appropriate resources effectively and ethically to compare alternative solutions which address the problem. They must be able to understand the importance of ethical and social responsibility in application of specialized knowledge, design processes and documentation.
69	EE474	ENERGY MANAGEMENT AND AUDITING	The primary objective of Energy Audit is to determine ways to reduce energy consumption per unit of product output or to lower operating cost. Energy Management includes planning and operation of energy production and energy consumption units.
70	EED416	PROJECT WORK	Students should evaluate the credibility of the resources available in library databases and incorporate appropriate resources effectively and ethically to compare alternative solutions which address the problem. They must be able to understand the importance of ethical and social responsibility in application of specialized knowledge, design processes and documentation.
71	EC468	SECURE COMMUNICATION	Exposed to the different approaches that handle security and the algorithms in use formaintaining data integrity and authenticity.Enabled student to appreciate the practical aspects of security features design and their implementation
72	MCN401	INDUSTRIAL SAFETY ENGINEERING	Engineering ethics are principles and guidelines engineers follow to ensure their decision-making is aligned with their obligations to the public, their clients, and the industry.
73	MP484	PROJECT MANAGEMENT	It comprises the values of responsibility, honesty, respect and fairness. These four core values are central to the project management profession and must be adhered to by project management professionals.
74	IE488	TOTAL QUALITY MANAGEMENT	QM is built on a foundation of ethics, integrity and trust. It fosters openness, fairness and sincerity and allows involvement by everyone.
75	CS010 710	PROJECT WORK	Students should evaluate the credibility of the resources available in library databases and incorporate appropriate resources effectively and ethically to compare alternative solutions which address the problem. They must be able to understand the importance of ethical and social responsibility in application of specialized knowledge, design processes and documentation.
76	CS010 807	PROJECT WORK	Students should evaluate the credibility of the resources available in library databases and incorporate appropriate resources effectively and ethically to compare alternative solutions which address the problem. They must be able to understand the importance of ethical and social responsibility in application of specialized knowledge, design processes and documentation.


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List and description of courses addressing cross cutting issues
Course contents relating to Environment and sustainability

Sl.No.	Course Code	Courses	Description
1	BE103	INTRODUCTION TO SUSTAINABLE ENGINEERING	Sustainable Engineering resonates with various aspects of our lives; encompassing water supply, waste management, food production, pollution reduction, housing, energy usage, transportation, restoration of natural environments, and enhancements in industrial processes.
2	BT 362	SUSTAINABLE ENERGY PROCESS	Course helps in finding methods of energy supply and consumption that help to make sure that current and future demands are met, ensure energy security for the future, and also reduce the effects on the environment.
3	FS482	RESPONSIBLE ENGINEERING	Course defines problems, researching, interpreting, and applying information, developing solutions, and making decisions.
4	BE 102	DESIGN ENGINEERING	This course details about the need for environmental conservation and sustainable development while practising designing of products and goods.
5	HUN101	LIFE SKILLS	Environmental ethics are discussed in this course
6	BE 103	INTRODUCTION TO SUSTAINABLE ENGINEERING	Sustainable Engineering resonates with various aspects of our lives; encompassing water supply, waste management, food production, pollution reduction, housing, energy usage, transportation, restoration of natural environments, and enhancements in industrial processes.
7	BE 102	DESIGN ENGINEERING	This course details about the need for environmental conservation and sustainable development while practising designing of products and goods.
8	HUN101	LIFE SKILLS	Environmental ethics are discussed in this course
9	16	BUSINESS AND SOCIETY	Course prepare learners to function as informed consumers, producers and workers in the society which satisfies environmental ethics.
10	MCN 201	SUSTAINABLE ENGINEERING	This course gives an awareness of environmental issues and the global initiatives towards attaining sustainability.
11	EST200	DESIGN AND ENGINEERING	This course details about the need for environmental conservation and sustainable development while practising designing of products and goods.
12	MCN202	CONSTITUTION OF INDIA	It tells us how and why people want to live together as a society and what they would like to do collectively to improve sustainable life in the country
13	HS211	LIFE SKILLS	Environmental ethics are discussed in this course

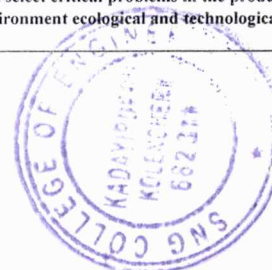

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List and description of courses addressing cross cutting issues
Course contents relating to Environment and Sustainability

Sl.No.	Course Code	Courses	Description
14	20MCA245	MINI PROJECT	Emerging the role of technology for sustaining our society and environment is becoming crucial so students must select critical problems in the products or in the techniques that focus on environment ecological and technological aspects
15	20MCA244	SEMINAR	Emerging the role of technology for sustaining our society and environment is becoming crucial so students must select critical problems in the products or in the techniques that focus on environment ecological and technological aspects
16	20MCA246	MAIN PROJECT	Emerging the role of technology for sustaining our society and environment is becoming crucial so students must select critical problems in the products or in the techniques that focus on environment ecological and technological aspects
17	21	ORGANIZATIONAL BEHAVIOUR II	Course helps to solve human problems in organisations, to integrate various aspects and levels of behaviour. It places greater emphasis on long-term consequences, creativity, and community considerations.
18	CE 374	AIR QUALITY MANAGEMENT	Course helps to understand the various forms of air pollutants and their effects on human and environment and know the various methods of controlling air pollutants
19	MCN 301	DISASTER MANAGEMENT	It helps in understanding sustainable practices during reconstruction and rehabilitation
20	CET 362	ENVIRONMENTAL IMPACT ASSESSMENT	It helps managing unkeep of environment by incorporating social audits
21	EET322	RENEWABLE ENERGY SYSTEMS	Course gives sufficient knowledge about the promising new and renewable sources of energy and equip students in working with projects and to take up research work in connected areas.
22	ECD334	MINI PROJECT	Emerging the role of technology for sustaining our society and environment is becoming crucial so students must select critical problems in the products or in the techniques that focus on environment ecological and technological aspects
23	EC 365	BIO MEDICAL ENGINEERING	Course helps to improve human health by applying engineering principles and methods to medical problems. It helps to adopt a sustainable lifestyle.
24	EC010606L04	PROJECT	Emerging the role of technology for sustaining our society and environment is becoming crucial so students must select critical problems in the products or in the techniques that focus on environment ecological and technological aspects
25	MCN301	DISASTER MANAGEMENT	It helps in understanding sustainable practices during reconstruction and rehabilitation
26	SB341	DESIGN PROJECT	Emerging the role of technology for sustaining our society and environment is becoming crucial so students must select critical problems in the products or in the techniques that focus on environment ecological and technological aspects

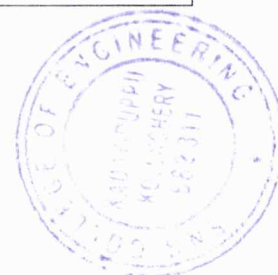

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List and description of courses addressing cross cutting issues
Course contents relating to Environment and Sustainability

Sl.No.	Course Code	Courses	Description
27	HUT310	MANAGEMENT FOR ENGINEERS	Sustainable energy models are integral to engineering management in that they promote responsible resource use, cost savings, regulatory compliance, and innovation.
28	HS300	PRINCIPLES OF MANAGEMENT	Course helps the managers to take right decisions at the right time. It helps managers to tackle the diverse problems in a dynamic business environment.
29	CSD 334	MINI PROJECT	Emerging the role of technology for sustaining our society and environment is becoming crucial so students must select critical problems in the products problems or in the techniques that focus on environment ecological and technological aspects
30	RLIMCA352	PROJECT AND VIVA VOCE	Emerging the role of technology for sustaining our society and environment is becoming crucial so students must select critical problems in the products problems or in the techniques that focus on environment ecological and technological aspects
31	RLMCA341	SEMINAR	Emerging the role of technology for sustaining our society and environment is becoming crucial so students must select critical problems in the products problems or in the techniques that focus on environment ecological and technological aspects
32	RLMCA351	MINI PROJECT	Emerging the role of technology for sustaining our society and environment is becoming crucial so students must select critical problems in the products problems or in the techniques that focus on environment ecological and technological aspects
33	CE405	ENVIRONMENTAL ENGINEERING I	Course objective is the significance of water resources and the factors affecting the quality and quantity of water and the various types of treatment techniques adopted for a public water supply system
34	CE 469	ENVIRONMENTAL IMPACT ASSESSMENT	It helps managing unkeep of environment by incorporating social audits
35	CE 402	ENVIRONMENTAL ENGINEERING II	Course objective is to understand the various sources and characteristics of wastewater and to know the various treatment methods available for wastewater treatment.
36	CE 474	MUNICIPAL SOLID WASTE MANAGEMENT	Course objective is to create an awareness of different types of solid waste generated in our environment and their ill effects and to study the various methods of collection, processing and disposal of solid wastes.
37	MCN 401	INDUSTRIAL SAFETY ENGINEERING	The course is intended to give knowledge of various safety management principles, various safety systems, various machine guarding devices, hazard identification techniques, energy sources, systems & applications and the need in the present context.
38	CET 415	ENVIRONMENTAL IMPACT ASSESSMENT	It helps managing unkeep of environment by incorporating social audits
39	EE403	DISTRIBUTION GENERATION AND SMART GRIDS	Distributed generation can benefit the environment if its use reduces the amount of electricity that must be generated at centralized power plants, in turn can reduce the environmental impacts of centralized generation.
40	EE366	ILLUMINATION TECHNOLOGY	Led technology can help to improve resource efficiency and reduce both the economic and environmental burden by: Energy savings: led lighting consumes significantly less energy than conventional light sources. Longer life: the long life of LED lamps reduces waste and the associated costs and environmental damage.

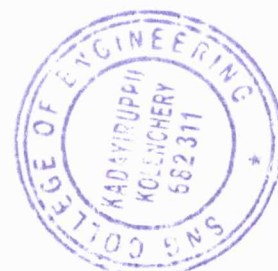
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List and description of courses addressing cross cutting issues
Course contents relating to Environment and Sustainability

Sl.No.	Course Code	Courses	Description
41	EE465	POWER QUALITY	To discuss various power quality issues and different methods to control them to support environment and lead a sustainable life.
42	EE 404	INDUSTRIAL INSTRUMENTATION AND AUTOMATION	It enables operators and engineers to monitor and control industrial processes, equipment, and systems in real-time, improving efficiency and productivity while ensuring worker safety.
43	EE492	PROJECT	Emerging the role of technology for sustaining our society and environment is becoming crucial so students must select critical problems in the products problems or in the techniques that focus on environment ecological and technological aspects
44	EE474	ENERGY MANAGEMENT AND AUDITING	Primary objective of this course to determine ways to reduce energy consumption per unit of product output or to lower operating cost. Energy Management includes planning and operation of energy production and energy consumption units.
45	EST200	DESIGN ENGINEERING	This course details about the need for environmental conservation and sustainable development while practising designing of products and goods.
46	EED416	PROJECT WORK	Emerging the role of technology for sustaining our society and environment is becoming crucial so students must select critical problems in the products problems or in the techniques that focus on environment ecological and technological aspects
47	CE482	ENVIRONMENTAL IMPACT ASSESSMENT	It helps managing unkeep of environment by incorporating social audits
48	CE488	DISASTER MANAGEMENT	It helps in understanding sustainable practices during reconstruction and rehabilitation
49	CS010 710	PROJECT WORK	Emerging the role of technology for sustaining our society and environment is becoming crucial so students must select critical problems in the products problems or in the techniques that focus on environment ecological and technological aspects
50	CS 451	SEMINAR & PROJECT PRILIMINARY	Emerging the role of technology for sustaining our society and environment is becoming crucial so students must select critical problems in the products problems or in the techniques that focus on environment ecological and technological aspects
51	CS010 807	PROJECT WORK	Emerging the role of technology for sustaining our society and environment is becoming crucial so students must select critical problems in the products problems or in the techniques that focus on environment ecological and technological aspects

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List and description of courses addressing cross cutting issues

Course contents relating to Human Values

Sl. No.	Course Code	Courses	DESCRIPTION
17	CS 234	DIGITAL SYSTEMS LAB	Helps to restorev sharing , guidance ,appreciation , team work and integrity.
18	CSL 202	DIGITAL LAB	Helps to restorev sharing , guidance ,appreciation , team work and integrity.
19		MINI PROJECT	Select critical problems in the products, process or techniques that are beneficial to society which impede the successful implementation of projects.function effectively as a team member or as an individual for the design, implementation and management of identified problems.
20	20MCA244	SEMINAR	Select critical problems in the products, process or techniques that are beneficial to society which impede the successful implementation of projects.function effectively as a team member or as an individual for the design, implementation and management of identified problems.
21	20MCA246	MAIN PROJECT	Select critical problems in the products, process or techniques that are beneficial to society which impede the successful implementation of projects.function effectively as a team member or as an individual for the design, implementation and management of identified problems.
22	HUT 300	INDUSTRIAL ECONOMICS & FOREIGN TRADE	Foreign trade is the reflection of economic relationships among the individual economies and represents the part of the country foreign relationships, which include trade exchange of a part of the production.
23	EE341	DESIGN PROJECT	Select critical problems in the products, process or techniques that are beneficial to society which impede the successful implementation of projects.function effectively as a team member or as an individual for the design, implementation and management of identified problems.
24	HS300	PRINCIPLES OF MANAGEMENT	Subject focus on impotence of hirearchy and effective communication in an organization.
25	HUT310	MANAGEMENT FOR ENGINEERS	The study of human values is fundamental to the understanding of managing and organizational behavior the value orientations of managers underlie managerial behavior.Values give a right support in staying motivated all the time,
26	EET322	RENEWABLE ENERGY SYSTEMS	Renewable energies are sources of clean, inexhaustible and increasingly competitive energy. This course dipicts the human values by protecting the earth and mankind by using renewable energy such as sun ,wind ,water etc.They produce neither greenhouse gases – which cause climate change– nor polluting emissions. Their costs are also falling and at a sustainable rate, whereas the general cost trend for fossil fuels is in the opposite direction in spite of their present volatility.
27	EC 365	BIO MEDICAL ENGINEERING	Biomedical engineers can combine their diverse skills to create solutions to continuing worldwide health issues, helping to change how patients are treated and lowering the cost of care.
28	MCN301	DISASTER MANAGEMENT	Subject gives an insight into the importance of incorporating humanitarian during crisis management.
29	SB341	DESIGN PROJECT	Select critical problems in the products, process or techniques that are beneficial to society which impede the successful implementation of projects.function effectively as a team member or as an individual for the design, implementation and management of identified problems.
30	HUT310	MANAGEMENT FOR ENGINEERS	Human values can be considered as the guidelines or code of conduct for the mangers that they must respect and adhere to in the business organization.
31	CSD334	MINI PROJECT	Select critical problems in the products, process or techniques that are beneficial to society which impede the successful implementation of projects.function effectively as a team member or as an individual for the design, implementation and management of identified problems.



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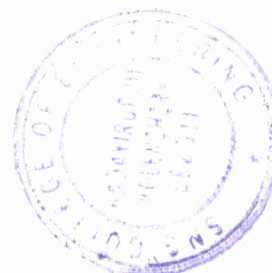


List and description of courses addressing cross cutting issues

Course contents relating to Human Values

Sl. No.	Course Code	Courses	DESCRIPTION
1	HS210	LIFE SKILLS	This course equips the students to develop and awareness of the self and apply well-defined techniques to cope with emotions and stress.
2	HUN102	PROFESSIONAL COMMUNICATION	Course help students to improve their communication skills in both workspace and in community .It boosts employee morale, engagement, productivity, and satisfaction. Communication is also key for better team collaboration and cooperation. Effective workplace communication helps drive better results for individuals, teams, and organizations.
3	MNC201	SUSTAINABLE ENGINEERING	It is useful as it incorporates SDGs which have than values at it its core.
4	CE488	DISASTER MANAGEMENT	Subject gives an insight into the importance of incorporating humanitarian during crisis management.
5	HUN101	LIFE SKILL	This course equips the students to develop and awareness of the self and apply well-defined techniques to cope with emotions and stress.
6	BE 102	DESIGN ENGINEERING	Engineers who are taught human values have been known to display strong work ethics, which in turn enhance their performance as engineers.
7	BE103	INTRODUCTION TO SUSTAINABLE ENGINEERING	It is useful as it incorporates SDGs which have than values at it its core.
8	RLMCA107	PRINCIPLES OF MANAGEMENT	Subject focus on impornce of hirearchy and effective communication in an organization.
9	20MCA164	ORGANIZATIONAL BEHAVIOUR	Turning individuals into team players developing interpersonal awareness .It helps to improve leadership quality ,team building,decision making for making meaningful contribution to industry ,government and society.
10	20MCA182	BUSINESS MANAGEMENT	Human values can be considered as the guidelines or code of conduct for the mangers that they must respect and adhere to in the business organization.
11	12	ORGANIZATIONAL BEHAVIOUR	This course highlighta important aspect to human resources. It focus on understanding how and why individuals perform in a certain way, organizations can better recruit, retain, and deploy workers to achieve its mission
12	HUT 200	PROFESSIONAL ETHICS	Ethical values, such as honesty, integrity, and respect for others, are essential for building strong relationships. creating a sense of purpose, and living a meaningful life. Human values, such as compassion, kindness, and empathy, are critical for cultivating a sense of connection with others and creating a sense of community.
13	HS200	BUSINESS ECONOMICS	Course teaches and solves diverse business problems using various economic tools, ideas, and approaches. The branch of economics deals with the logic, ideas, and analytical tools utilised to make reasonable business decisions.
14	MCN202	CONSTITUTION OF INDIA	Course helps students to learn the values which is expressed in the Preamble are expressed as objectives of the Constitution. It focus on sovereignty, socialism, secularism, democracy, republican character of Indian State, justice, liberty, equality, fraternity, human dignity and the unity and integrity of the Nation.
15	EST200	DESIGN & ENGINEERING	Course helps to understand the moral values that ought to guide the Engineering profession, Resolve the moral issues in the profession.
16	HS211	LIFE SKILLS	This course equips the students to develop and awareness of the self and apply well-defined techniques to cope with emotions and stress.


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List and description of courses addressing cross cutting issues

Course contents relating to Human Values

Sl. No.	Course Code	Courses	DESCRIPTION
32	RLMCA352	PROJECT AND VIVA VOCE	Select critical problems in the products, process or techniques that are beneficial to society which impede the successful implementation of projects.function effectively as a team member or as an individual for the design, implementation and management of identified problems.
33	RLMCA341	SEMINAR	Select critical problems in the products, process or techniques that are beneficial to society which impede the successful implementation of projects.function effectively as a team member or as an individual for the design, implementation and management of identified problems.
34	RLMCA351	MINI PROJECT	Select critical problems in the products, process or techniques that are beneficial to society which impede the successful implementation of projects.function effectively as a team member or as an individual for the design, implementation and management of identified problems.
35	RLMCA303	E-COMMERCE	It allows the customer to connect with your brand and business, feel seen and understood, and return time and time again. This creates a loyal customer, which is the goal of most eCommerce businesses, as customer retention offers better ROI (Return on investment) than finding new customers.
36	RLMCA371	SOCIAL NETWORK ANALYSIS	Social network analysis is a method of studying relationships between objects and events in a social structure. It is used in many fields, including sociology, anthropology, economics, political science, and marketing. Social network analysis can be used to identify the key players in a social structure and their relationships with each other. It can also be used to identify the power structures that exist within an organization or society.
37	CE451	SEMINAR & PROJECT PRELIMINARY	Select critical problems in the products, process or techniques that are beneficial to society which impede the successful implementation of projects.function effectively as a team member or as an individual for the design, implementation and management of identified problems.
38	CE492	PROJECT	Select critical problems in the products, process or techniques that are beneficial to society which impede the successful implementation of projects.function effectively as a team member or as an individual for the design, implementation and management of identified problems.
39	CED413	SEMINAR	Select critical problems in the products, process or techniques that are beneficial to society which impede the successful implementation of projects.function effectively as a team member or as an individual for the design, implementation and management of identified problems.
40	CED415	PROJECT PHASE I	Select critical problems in the products, process or techniques that are beneficial to society which impede the successful implementation of projects.function effectively as a team member or as an individual for the design, implementation and management of identified problems.

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HUN 101	LIFE SKILLS	CATEGORY	L	T	P	CREDIT	YEAR OF INTRODUCTION
		MNC	2	0	2	---	2019

Preamble: Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes. Development of one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete, leading and generating change, and staying rooted in time-tested values and principles is being aimed at. This course is designed to enhance the employability and maximize the potential of the students by introducing them to the principles that underly personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

Prerequisite: None

Course Outcomes: After the completion of the course the student will be able to

CO 1	Define and Identify different life skills required in personal and professional life
CO 2	Develop an awareness of the self and apply well-defined techniques to cope with emotions and stress.
CO 3	Explain the basic mechanics of effective communication and demonstrate these through presentations.
CO 4	Take part in group discussions
CO 5	Use appropriate thinking and problem solving techniques to solve new problems
CO 6	Understand the basics of teamwork and leadership

Mapping of course outcomes with program outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1						2		1	2	2	1	3
CO 2									3			2
CO 3						1			1	3		
CO 4										3		1
CO 5		3	2	1								
CO 6						1			3			

Mark distribution

Total Marks	CIE	ESE	ESE Duration
100	50	50	2 hours


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Continuous Internal Evaluation

Total Marks: 50

Attendance	: 10 marks
Regular assessment	: 15 marks
Series test (one test only, should include first three modules)	: 25 marks

Regular assessment

- Group Discussion (Marks: 9)
Create groups of about 6 students each and engage them on a GD on a suitable topic for about 20 minutes. Parameters to be used for evaluation are as follows:

- Communication Skills : 3 marks
- Subject Clarity : 2 marks
- Group Dynamics : 2 marks
- Behaviours & Mannerisms : 2 marks

- Presentation Skills (Marks: 6)
Identify a suitable topic and ask the students to prepare a presentation (preferably a power point presentation) for about 10 minutes. Parameters to be used for evaluation are as follows:

- Communication Skills : 2 marks
- Platform Skills : 2 marks
- Subject Clarity/Knowledge : 2 marks

End Semester Examination

Total Marks: 50

Time: 2 hrs.

Part A: Short answer question (25 marks)

There will be one question from each MODULE (five questions in total, five marks each). Each question should be written in about maximum of 400 words. Parameters to be used for evaluation are as follows:

- (i) Content Clarity/Subject Knowledge
- (ii) Presentation style
- (iii) Organization of content

Part B: Case Study (25 marks)

The students will be given a case study with questions at the end. The students have to analyze the case and answer the question at the end. Parameters to be used for evaluation are as follows:

- (i) Analyze the case situation
- (ii) Key players/characters of the case
- (iii) Identification of the problem (both major & minor if exists)
- (iv) Bring out alternatives
- (v) Analyze each alternative against the problem
- (vi) Choose the best alternative
- (vii) Implement as solution
- (viii) Conclusion



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- (ix) Answer the question at the end of the case

Course Level Assessment Questions

Course Outcome 1 (CO1):

1. List 'life skills' as identified by WHO
2. What do you mean by effective communication?
3. What are the essential life skills required by a professional?

Course Outcome 2 (CO2)

1. Identify an effective means to deal with workplace stress.
2. How can a student apply journaling to stress management?
3. What is the PATH method? Describe a situation where this method can be used effectively.

Course Outcome 3(CO3):

1. Identify the communication network structure that can be observed in the given situations. Describe them.
 - (a) A group discussion on development.
 - (b) An address from the Principal regarding punctuality.
 - (c) A reporter interviewing a movie star.
 - (d) Discussing the answers of a test with a group of friends.
2. Elucidate the importance of non-verbal communication in making a presentation
3. Differentiate between kinesics, proxemics, and chronemics with examples.

Course Outcome 4 (CO4):

1. How can a participant conclude a group discussion effectively?
2. 'Listening skills are essential for effectively participating in a group discussion.' Do you agree? Substantiate your answer.

Course Outcome 5 (CO5):

1. Illustrate the creative thinking process with the help of a suitable example
2. Translate the following problem from verbal to graphic form and find the solution : *In a quiz, Ananth has 50 points more than Bimal, Chinmay has 60 points less than Ananth, and Dharini has 20 points ahead of Chinmay. What is the difference in points between Bimal and Dharini?*

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3. List at least five ways in which the problem "How to increase profit?" can be redefined

Course Outcome 6 (CO6):

1. A group of engineers decided to brainstorm a design issue on a new product. Since no one wanted to disagree with the senior members, new ideas were not flowing freely. What group dynamics technique would you suggest to avoid this 'groupthink'? Explain the procedure.
2. "A group focuses on individual contribution, while a team must focus on synergy." Explain.
3. Identify the type of group formed / constituted in each of the given situations
 - a) A Police Inspector with subordinates reporting to him
 - b) An enquiry committee constituted to investigate a specific incident
 - c) The Accounts Department of a company
 - d) A group of book lovers who meet to talk about reading

Syllabus

Module 1

Overview of Life Skills: Meaning and significance of life skills, Life skills identified by WHO: Self-awareness, Empathy, Critical thinking, Creative thinking, Decision making, problem solving, Effective communication, interpersonal relationship, coping with stress, coping with emotion.

Life skills for professionals: positive thinking, right attitude, attention to detail, having the big picture, learning skills, research skills, perseverance, setting goals and achieving them, helping others, leadership, motivation, self-motivation, and motivating others, personality development, IQ, EQ, and SQ

Module 2

Self-awareness: definition, need for self-awareness; Coping With Stress and Emotions, Human Values, tools and techniques of SA: questionnaires, journaling, reflective questions, meditation, mindfulness, psychometric tests, feedback.

Stress Management: Stress, reasons and effects, identifying stress, stress diaries, the four A's of stress management, techniques, Approaches: action-oriented, emotion-oriented, acceptance-oriented, resilience, Gratitude Training,

Coping with emotions: Identifying and managing emotions, harmful ways of dealing with emotions, PATH method and relaxation techniques.



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Morals, Values and Ethics: Integrity, Civic Virtue, Respect for Others, Living Peacefully. Caring, Sharing, Honesty, Courage, Valuing Time, Time management, Co operation, Commitment, Empathy, Self-Confidence, Character, Spirituality, Avoiding Procrastination, Sense of Engineering Ethics.

Module 3

21st century skills: Creativity, Critical Thinking, Collaboration, Problem Solving, Decision Making, Need for Creativity in the 21st century, Imagination, Intuition, Experience, Sources of Creativity, Lateral Thinking, Myths of creativity, Critical thinking Vs Creative thinking, Functions of Left Brain & Right brain, Convergent & Divergent Thinking, Critical reading & Multiple Intelligence.

Steps in problem solving: Problem Solving Techniques, Six Thinking Hats, Mind Mapping, Forced Connections. Analytical Thinking, Numeric, symbolic, and graphic reasoning. Scientific temperament and Logical thinking.

Module 4

Group and Team Dynamics: Introduction to Groups: Composition, formation, Cycle, thinking, Clarifying expectations, Problem Solving, Consensus, Dynamics techniques, Group vs Team, Team Dynamics, Virtual Teams. Managing team performance and managing conflicts, Intrapreneurship.

Module 5

Leadership: Leadership framework, entrepreneurial and moral leadership, vision, cultural dimensions. Growing as a leader, turnaround leadership, managing diverse stakeholders, crisis management. Types of Leadership, Traits, Styles, VUCA Leadership, Levels of Leadership, Transactional vs Transformational Leaders, Leadership Grid, Effective Leaders.

Lab Activities

Verbal

Effective communication and Presentation skills.

Different kinds of communication; Flow of communication; Communication networks, Types of barriers; Miscommunication

Introduction to presentations and group discussions.

Learning styles: visual, aural, verbal, kinaesthetic, logical, social, solitary; Previewing, KWL table, active listening, REAP method

Note-taking skills: outlining, non-linear note-taking methods, Cornell notes, three column note taking.

Memory techniques: mnemonics, association, flashcards, keywords, outlines, spider diagrams and mind maps, spaced repetition.

Time management: auditing, identifying time wasters, managing distractions, calendars and checklists; Prioritizing - Goal setting, SMART goals; Productivity tools and apps, Pomodoro technique.

Non Verbal:

Non-verbal Communication and Body Language: Forms of non-verbal communication; Interpreting body-language cues; Kinesics; Proxemics; Chronemics; Effective use of body language, Communication in a multi cultural environment.

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HUN 102	PROFESSIONAL COMMUNICATION	CATEGORY	L	T	P	CREDIT
		MNC	2	0	2	-

Preamble: Clear, precise, and effective communication has become a sine qua non in today's information-driven world given its interdependencies and seamless connectivity. Any aspiring professional cannot but master the key elements of such communication. The objective of this course is to equip students with the necessary skills to listen, read, write, and speak so as to comprehend and successfully convey any idea, technical or otherwise, as well as give them the necessary polish to become persuasive communicators.

Prerequisite: None

Course Outcomes: After the completion of the course the student will be able to

CO 1	Develop vocabulary and language skills relevant to engineering as a profession
CO 2	Analyze, interpret and effectively summarize a variety of textual content
CO 3	Create effective technical presentations
CO 4	Discuss a given technical/non-technical topic in a group setting and arrive at generalizations/consensus
CO 5	Identify drawbacks in listening patterns and apply listening techniques for specific needs
CO 6	Create professional and technical documents that are clear and adhering to all the necessary conventions

Mapping of course outcomes with program outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1										3		2
CO 2										1		3
CO 3						1			1	3		
CO 4										3		1
CO 5		1							2	3		
CO 6	1					1			1	3		

Mark distribution

Total Marks	CIE	ESE	ESE Duration
100	50	50	2 hours

Continuous Internal Evaluation

Total Marks: 50

Attendance



: 10 marks Regular assessment



: 25 marks

Series test (one test only, should include verbal aptitude for placement and higher studies, this test will be conducted for 50 marks and reduced to 15) : 15 marks

Regular assessment

Project report presentation and Technical presentation through PPT : 7.5 marks

Listening Test : 5 marks

Group discussion/mock job interview : 7.5 marks

Resume submission : 5 marks

End Semester Examination

Total Marks: 50, Time: 2 hrs.

Syllabus

Module 1

Use of language in communication: Significance of technical communication Vocabulary Development: technical vocabulary, vocabulary used in formal letters/emails and reports, sequence words, misspelled words, compound words, finding suitable synonyms, paraphrasing, verbal analogies. Language Development: subject-verb agreement, personal passive voice, numerical adjectives, embedded sentences, clauses, conditionals, reported speech, active/passive voice.

Technology-based communication: Effective email messages, slide presentations, editing skills using software.

Modern day research and study skills: search engines, repositories, forums such as Git Hub, Stack Exchange, OSS communities (MOOC, SWAYAM, NPTEL), and Quora; Plagiarism

Module 2

Reading, Comprehension, and Summarizing: Reading styles, speed, valuation, critical reading, reading and comprehending shorter and longer technical articles from journals, newspapers, identifying the various transitions in a text, SQ3R method, PQRS method, speed reading. Comprehension: techniques, understanding textbooks, marking and underlining, Note-taking: recognizing non-verbal cues.

Module 3

Oral Presentation: Voice modulation, tone, describing a process, Presentation Skills: Oral presentation and public speaking skills, business presentations, Preparation: organizing the material, self-Introduction, introducing the topic, answering questions, individual presentation practice, presenting visuals effectively.

Debate and Group Discussions: introduction to Group Discussion (GD), differences between GD and debate; participating GD, understanding GD, brainstorming the topic, questioning and clarifying, GD strategies, activities to improve GD skills

Module 4

Listening and Interview Skills Listening: Active and Passive listening, listening: for general content, to fill up information, intensive listening, for specific information, to answer, and to understand. Developing effective listening skills, barriers to effective listening, listening to longer technical talks, listening to classroom lectures, talks on engineering /technology, listening to documentaries and making notes, TED talks.

Interview Skills: types of interviews, successful interviews, interview etiquette, dress code, body language



telephone/online (skype) interviews, one-to-one interview & panel interview, FAQs related to job interviews

Module 5

Formal writing: Technical Writing: differences between technical and literary style. Letter Writing (formal, informal and semi formal), Job applications, Minute preparation, CV preparation (differences between Bio-Data, CV and Resume), and Reports. Elements of style, Common Errors in Writing: describing a process, use of sequence words, Statements of Purpose, Instructions, Checklists.

Analytical and issue-based Essays and Report Writing: basics of report writing; Referencing Style (IEEE Format), structure of a report; types of reports, references, bibliography.

Lab Activities

Written: Letter writing, CV writing, Attending a meeting and Minute Preparation, Vocabulary Building

Spoken: Phonetics, MMFS (Multimedia Feedback System), Mirroring, Elevator Pitch, telephone etiquette, qualities of a good presentation with emphasis on body language and use of visual aids. Listening: Exercises based on audio materials like radio and podcasts. Listening to Song. practice and exercises.

Reading: Speed Reading, Reading with the help of Audio Visual Aids, Reading Comprehension Skills

Mock interview and Debate/Group Discussion: concepts, types, Do's and don'ts- intensive practice



D. An

Course No.	Course Name	L-T-P-Credits	Year of Introduction
BEI03	INTRODUCTION TO SUSTAINABLE ENGINEERING	2-0-1-3	2016

Course Objectives

- To have an increased awareness among students on issues in areas of sustainability
- To understand the role of engineering and technology within sustainable development;
- To know the methods, tools, and incentives for sustainable product-service system development
- To establish a clear understanding of the role and impact of various aspects of engineering and engineering decisions on environmental, societal, and economic problems.

Syllabus

Sustainability- need and concept, challenges, Environment acts and protocols, Global, Regional and Local environmental issues, Natural resources and their pollution, Carbon credits, Zero waste concept ISO 14000, Life Cycle Analysis, Environmental Impact Assessment studies, Sustainable habitat, Green buildings, green materials, Energy, Conventional and renewable sources, Technology and sustainable development, Sustainable urbanization, Industrial Ecology.

Expected outcome

The student will be

- Able to understand the different types of environmental pollution problems and their sustainable solutions
- Able to work in the area of sustainability for research and education
- Having a broader perspective in thinking for sustainable practices by utilizing the engineering knowledge and principles gained from this course

Reference Books:

- Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.
- Bradley, A.S; Adebayo,A.O., Maria, P. Engineering applications in sustainable design and development, Cengage learning
- Environment Impact Assessment Guidelines, Notification of Government of India, 2006
- Mackenthun, K.M., Basic Concepts in Environmental Management, Lewis Publication, London, 1998
- ECBC Code 2007, Bureau of Energy Efficiency, New Delhi Bureau of Energy Efficiency Publications-Rating System, TERI Publications - GRIHA Rating System
- Ni bin Chang, Systems Analysis for Sustainable Engineering: Theory and Applications, McGraw-Hill Professional.
- Twidell, J. W. and Weir, A. D., Renewable Energy Resources, English Language Book Society (ELBS).

N. H.

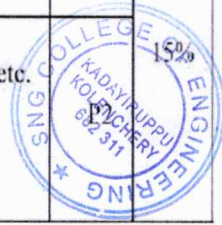
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- Purohit, S. S., Green Technology - An approach for sustainable environment, Agrobios publication

Course Plan


Module	Contents	Hours	Sem. Exam Marks
I	Sustainability - Introduction, Need and concept of sustainability, Social-environmental and economic sustainability concepts. Sustainable development, Nexus between Technology and Sustainable development, Challenges for Sustainable Development. Multilateral environmental agreements and Protocols - Clean Development Mechanism (CDM), Environmental legislations in India - Water Act, Air Act.	L4	15%
	Students may be assigned to do at least one project eg: a) Identifying/assessment of sustainability in your neighbourhood in education, housing, water resources, energy resources, food supplies, land use, environmental protection etc. b) Identify the threats for sustainability in any selected area and explore solutions for the same	P1	
II	Air Pollution, Effects of Air Pollution; Water pollution- sources, Sustainable wastewater treatment, Solid waste - sources, impacts of solid waste, Zero waste concept, 3 R concept. Global environmental issues- Resource degradation, Climate change, Global warming, Ozone layer depletion, Regional and Local Environmental Issues. Carbon credits and carbon trading, carbon foot print.	L6	15%
	Students may be assigned to do at least one project for eg: a) Assessing the pollution status of a small area b) Programmes for enhancing public environmental awareness c) Observe a pond nearby and think about the different measures that can be adopted for its conservation	P3	
FIRST INTERNAL EXAM			
III	Environmental management standards, ISO 14000 series, Life Cycle Analysis (LCA) - Scope and Goal, Bio-mimicking, Environment Impact Assessment (EIA) - Procedures of EIA in India.	L4	15%
	Students may be assigned to do at least one project eg: a) Conducting LCA of products (eg. Aluminium cans, PVC bottles, cars etc. or activities (Comparison of land filling and open burning) b) Conducting an EIA study of a small project (eg. Construction of a building)		



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IV	Basic concepts of sustainable habitat, Green buildings, green materials for building construction, material selection for sustainable design, green building certification, Methods for increasing energy efficiency of buildings. Sustainable cities, Sustainable transport.	L5	15%
	Students may be assigned to do at least one project eg: a) Consider the design aspects of a sustainable building for your campus b) Explore the different methods that can be adopted for maintaining a sustainable transport system in your city.	P2	
SECOND INTERNAL EXAM			
V	Energy sources: Basic concepts-Conventional and non-conventional, solar energy, Fuel cells, Wind energy, Small hydro plants, bio-fuels, Energy derived from oceans, Geothermal energy.	L5	20%
	Students may be assigned to do at least one project eg: a) Find out the energy savings that can be achieved by the installation of a solar water heater b) Conduct a feasibility study for the installation of wind mills in Kerala	P2	
VI	Green Engineering, Sustainable Urbanisation, industrialisation and poverty reduction; Social and technological change, Industrial Processes: Material selection, Pollution Prevention, Industrial Ecology, Industrial symbiosis.	L5	20%
	Students may be assigned to do a group project eg: a) Collect details for instances of climate change in your locality b) Find out the carbon credits you can gain by using a sustainable transport system (travelling in a cycle or car pooling from college to home) c) Have a debate on the topics like: Industrial Ecology is a Boon or Bane for Industries?/Are we scaring the people on Climate Change unnecessarily?/Technology enables Development sustainable or the root cause of unsustainability?	P3	
END SEMESTER EXAM			

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Code.	Course Name	L	T	P	Hrs	Credit
HUT 200	Professional Ethics	2	0	0	2	2

Preamble: To enable students to create awareness on ethics and human values.

Prerequisite: Nil

Course Outcomes: After the completion of the course the student will be able to

CO 1	Understand the core values that shape the ethical behaviour of a professional.
CO 2	Adopt a good character and follow an ethical life.
CO 3	Explain the role and responsibility in technological development by keeping personal ethics and legal ethics.
CO 4	Solve moral and ethical problems through exploration and assessment by established experiments.
CO 5	Apply the knowledge of human values and social values to contemporary ethical values and global issues.

Mapping of course outcomes with program outcomes

	O1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	O10	O11	O12
CO 1								2			2	
CO 2								2			2	
CO 3								3			2	
CO 4								3			2	
CO 5								3			2	

Assessment Pattern

Bloom's category	Continuous Assessment Tests		End Semester Exam
	1	2	
Remember	15	15	30
Understood	20	20	40
Apply	15	15	30

Mark distribution

Total Marks	CIE	ESE	ESE Duration
150	50	100	3 hours



A. A.

Continuous Internal Evaluation Pattern:

Attendance	: 10 marks
Continuous Assessment Tests (2 Nos)	: 25 marks
Assignments/Quiz	: 15 marks

End Semester Examination Pattern: There will be two parts; Part A and Part B. Part A contains 10 questions with 2 questions from each module, having 3 marks for each question. Students should answer all questions. Part B contains 2 questions from each module of which student should answer any one. Each question can have maximum 2 sub-divisions and carry 14 marks.

Course Level Assessment Questions Course

Outcome 1 (CO1):

1. Define integrity and point out ethical values.
2. Describe the qualities required to live a peaceful life.
3. Explain the role of engineers in modern society.

Course Outcome 2 (CO2)

1. Derive the codes of ethics.
2. Differentiate consensus and controversy.
3. Discuss in detail about character and confidence.

Course Outcome 3(CO3):

1. Explain the role of professional's ethics in technological development.
2. Distinguish between self interest and conflicts of interest.
3. Review on industrial standards and legal ethics.

Course Outcome 4 (CO4):

1. Illustrate the role of engineers as experimenters.
2. Interpret the terms safety and risk.
3. Show how the occupational crimes are resolved by keeping the rights of employees.

Course Outcome 5 (CO5):

1. Exemplify the engineers as managers.
2. Investigate the causes and effects of acid rain with a case study.
3. Explore the need of environmental ethics in technological developmen

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Syllabus

Module 1 – Human Values.

Morals, values and Ethics – Integrity- Academic integrity-Work Ethics- Service Learning- Civic Virtue- Respect for others- Living peacefully- Caring and Sharing- Honestly- courage-Cooperation commitment- Empathy-Self Confidence -Social Expectations.

Module 2 - Engineering Ethics & Professionalism.

Senses of Engineering Ethics - Variety of moral issues- Types of inquiry- Moral dilemmas –Moral Autonomy – Kohlberg’s theory- Gilligan’s theory- Consensus and Controversy-Profession and Professionalism- Models of professional roles-Theories about right action –Self interest-Customs and Religion- Uses of Ethical Theories.

Module 3- Engineering as social Experimentation.

Engineering as Experimentation – Engineers as responsible Experimenters- Codes of Ethics- Plagiarism- A balanced outlook on law - Challenges case study- Bhopal gas tragedy.

Module 4- Responsibilities and Rights.

Collegiality and loyalty – Managing conflict- Respect for authority- Collective bargaining- Confidentiality- Role of confidentiality in moral integrity-Conflicts of interest- Occupational crime- Professional rights- Employee right- IPR Discrimination.

Module 5- Global Ethical Issues.

Multinational Corporations- Environmental Ethics- Business Ethics- Computer Ethics -Role in Technological Development- Engineers as Managers- Consulting Engineers- Engineers as Expert witnesses and advisors-Moral leadership.

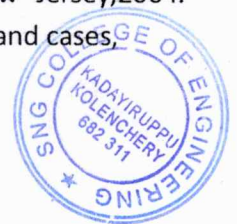
Text Book

1. M Govindarajan, S Natarajan and V S Senthil Kumar, Engineering Ethics, PHI Learning Private Ltd, New Delhi,2012.
2. R S Naagarazan, A text book on professional ethics and human values, New age international (P) limited ,New Delhi,2006.

Reference Books

1. Mike W Martin and Roland Schinzinger, Ethics in Engineering,4th edition, Tata McGraw Hill Publishing Company Pvt Ltd, New Delhi,2014.
2. Charles D Fleddermann, Engineering Ethics, Pearson Education/ Prentice Hall of India, New Jersey,2004.
3. Charles E Harris, Michael S Protchard and Michael J Rabins, Engineering Ethics- Concepts and cases, Wadsworth Thompson Learning, United states,2005.
4. <http://www.slideword.org/slidestag.aspx/human-values-and-Professional-ethics>.

A. Anu



Course Contents and Lecture Schedule

SL.No	Topic	No. of Lectures
1	Module 1 – Human Values.	25
1.1	Morals, values and Ethics, Integrity, Academic Integrity, Work Ethics	1
1.2	Service Learning, Civic Virtue, Respect for others, Living peacefully	1
1.3	Caring and Sharing, Honesty, Courage, Co-operation commitment	2
1.4	Empathy, Self Confidence, Social Expectations	1
2	Module 2- Engineering Ethics & Professionalism.	
2.1	Senses of Engineering Ethics, Variety of moral issues, Types of inquiry	1
2.2	Moral dilemmas, Moral Autonomy, Kohlberg's theory	1
2.3	Gilligan's theory, Consensus and Controversy, Profession & Professionalism, Models of professional roles, Theories about right action	2
2.4	Self interest-Customs and Religion, Uses of Ethical Theories	1
3	Module 3- Engineering as social Experimentation.	
3.1	Engineering as Experimentation, Engineers as responsible Experimenters	1
3.2	Codes of Ethics, Plagiarism, A balanced outlook on law	2
3.3	Challenger case study, Bhopal gas tragedy	2
4	Module 4- Responsibilities and Rights.	
4.1	Collegiality and loyalty, Managing conflict, Respect for authority	1
4.2	Collective bargaining, Confidentiality, Role of confidentiality in moral integrity, Conflicts of interest	2
4.3	Occupational crime, Professional rights, Employee right, IPR Discrimination	2
5	Module 5- Global Ethical Issues.	
5.1	Multinational Corporations, Environmental Ethics, Business Ethics, Computer Ethics	2
5.2	Role in Technological Development, Moral leadership	1
5.3	Engineers as Managers, Consulting Engineers, Engineers as Expert witnesses and advisors	2

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CODE MCN201	SUSTAINABLE ENGINEERING	CATEGORY	L	T	P	CREDIT
			2	0	0	NIL

Preamble: Objective of this course is to inculcate in students an awareness of environmental issues and the global initiatives towards attaining sustainability. The student should realize the potential of technology in bringing in sustainable practices.

Prerequisite: NIL

Course Outcomes: After the completion of the course the student will be able to

CO 1	Understand the relevance and the concept of sustainability and the global initiatives in this direction
CO 2	Explain the different types of environmental pollution problems and their sustainable solutions
CO 3	Discuss the environmental regulations and standards
CO 4	Outline the concepts related to conventional and non-conventional energy
CO 5	Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles

Mapping of course outcomes with program outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1						2	3					2
CO 2						2	3					2
CO 3						2	3					2
CO 4						2	3					2
CO 5						2	3					2

Assessment Pattern

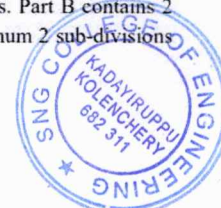
Mark distribution

Bloom's Category	Continuous Assessment Tests		End Semester Examination
	1	2	
Remember	20	20	40
Understand	20	20	40
Apply	10	10	20
Analyse			
Evaluate			
Create			

Continuous Internal Evaluation Pattern:

Attendance : 10 marks
 Continuous Assessment Test (2 numbers) : 25 marks
 Assignment/Quiz/Course project : 15 marks

End Semester Examination Pattern: There will be two parts; Part A and Part B. Part A contain 10 questions with 2 questions from each module, having 3 marks for each question. Students should answer all questions. Part B contains 2 questions from each module of which student should answer any one. Each question can have maximum 2 sub-divisions and carry 14 marks.



Total Marks	CIE	ESE	ESE Duration
150	50	100	3 hours

Course Level Assessment Questions

Course Outcome 1 (CO1): Understand the relevance and the concept of sustainability and the global initiatives in this direction

1. Explain with an example a technology that has contributed positively to sustainable development.
2. Write a note on Millennium Development Goals.

Course Outcome 2 (CO2): Explain the different types of environmental pollution problems and their sustainable solutions

1. Explain the 3R concept in solid waste management?
2. Write a note on any one environmental pollution problem and suggest a sustainable solution.
3. In the absence of green house effect the surface temperature of earth would not have been suitable for survival of life on earth. Comment on this statement.

Course Outcome 3(CO3): Discuss the environmental regulations and standards

1. Illustrate Life Cycle Analysis with an example of your choice.
2. "Nature is the most successful designer and the most brilliant engineer that has ever evolved". Discuss.

Course Outcome 4 (CO4): Outline the concepts related to conventional and non-conventional energy

1. Suggest a sustainable system to generate hot water in a residential building in tropical climate.
2. Enumerate the impacts of biomass energy on the environment.

Course Outcome 5 (CO5): Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles

1. Suggest suitable measures to make the conveyance facilities used by your institution sustainable.



A. A. A.

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Syllabus

Sustainability- need and concept, technology and sustainable development-Natural resources and their pollution, Carbon credits, Zero waste concept. Life Cycle Analysis, Environmental Impact Assessment studies, Sustainable habitat, Green buildings, green materials, Energy, Conventional and renewable sources, Sustainable urbanization, Industrial Ecology.

Module 1

Sustainability: Introduction, concept, evolution of the concept; Social, environmental and economic sustainability concepts; Sustainable development, Nexus between Technology and Sustainable development; Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs), Clean Development Mechanism (CDM).

Module 2

Environmental Pollution: Air Pollution and its effects, Water pollution and its sources, Zero waste concept and 3 R concepts in solid waste management; Greenhouse effect, Global warming, Climate change, Ozone layer depletion, Carbon credits, carbon trading and carbon foot print, legal provisions for environmental protection.

Module 3

Environmental management standards: ISO 14001:2015 frame work and benefits, Scope and goal of Life Cycle Analysis (LCA), Circular economy, Bio-mimicking, Environment Impact Assessment (EIA), Industrial ecology and industrial symbiosis.

Module 4

Resources and its utilisation: Basic concepts of Conventional and non-conventional energy, General idea about solar energy, Fuel cells, Wind energy, Small hydro plants, bio-fuels, Energy derived from oceans and Geothermal energy.

Module 5

Sustainability practices: Basic concept of sustainable habitat, Methods for increasing energy efficiency in buildings, Green Engineering, Sustainable Urbanisation, Sustainable cities, Sustainable transport.

AA



Course No.	Course Name	L-T-P-Credits	Year of Introduction
HS210	LIFE SKILLS	2-0-2	2016
<p>Course Objectives</p> <p>To develop communication competence in prospective engineers.</p> <p>To enable them to convey thoughts and ideas with clarity and focus.</p> <p>To develop report writing skills.</p> <p>To equip them to face interview & Group Discussion.</p> <p>To inculcate critical thinking process.</p> <p>To prepare them on problem solving skills.</p> <p>To provide symbolic, verbal, and graphical interpretations of statements in a problem description.</p> <p>To understand team dynamics & effectiveness.</p> <p>To create an awareness on Engineering Ethics and Human Values.</p> <p>To instill Moral and Social Values, Loyalty and also to learn to appreciate the rights of others.</p> <p>To learn leadership qualities and practice them.</p>			
<p>Syllabus</p> <p>Communication Skill: Introduction to Communication, The Process of Communication, Barriers to Communication, Listening Skills, Writing Skills, Technical Writing, Letter Writing, Job Application, Report Writing, Non-verbal Communication and Body Language, Interview Skills, Group Discussion, Presentation Skills, Technology-based Communication.</p> <p>Critical Thinking & Problem Solving: Creativity, Lateral thinking, Critical thinking, Multiple Intelligence, Problem Solving, Six thinking hats Mind Mapping & Analytical Thinking.</p> <p>Teamwork: Groups, Teams, Group Vs Teams, Team formation process, Stages of Group, Group Dynamics, Managing Team Performance & Team Conflicts.</p> <p>Ethics, Moral & Professional Values: Human Values, Civic Rights, Engineering Ethics, Engineering as Social Experimentation, Environmental Ethics, Global Issues, Code of Ethics like ASME, ASCE, IEEE.</p> <p>Leadership Skills: Leadership, Levels of Leadership, Making of a leader, Types of leadership, Transactions Vs Transformational Leadership, VUCA Leaders, DART Leadership, Leadership Grid & leadership Formulation.</p>			
<p>Expected outcome</p> <p>Communicate effectively.</p> <p>Make effective presentations.</p> <p>Write different types of reports.</p> <p>Face interview & group discussion.</p> <p>Critically think on a particular problem.</p> <p>Solve problems.</p> <p>Work in Group & Teams</p> <p>Handle Engineering Ethics and Human Values.</p> <p>Become an effective leader.</p>			


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References:

Barun K. Mitra; (2011), "*Personality Development & Soft Skills*", First Edition; Oxford Publishers.

Kalyana; (2015) "*Soft Skill for Managers*"; First Edition; Wiley Publishing Ltd.

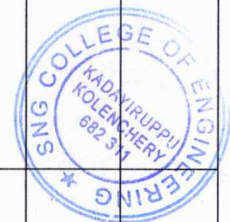
Larry James (2016); "*The First Book of Life Skills*"; First Edition; Embassy Books.

Shalini Verma (2014); "*Development of Life Skills and Professional Practice*"; First Edition; Sultan Chand (G/L) & Company

John C. Maxwell (2014); "*The 5 Levels of Leadership*", Centre Street, A division of Hachette Book Group Inc.

Course Plan

Module	Contents	Hours L-T-P		Sem. Exam Marks
		T	P	
I	Need for Effective Communication, Levels of communication; Flow of communication; Use of language in communication; Communication networks; Significance of technical communication, Types of barriers; Miscommunication; Noise; Overcoming measures,	2		
	Listening as an active skill; Types of Listeners; Listening for general content; Listening to fill up information; Intensive Listening; Listening for specific information; Developing effective listening skills; Barriers to effective listening skills.		2	
	Technical Writing: Differences between technical and literary style, Elements of style; Common Errors, Letter Writing: Formal, informal and demi-official letters; business letters, Job Application: Cover letter, Differences between bio-data, CV and Resume, Report Writing: Basics of Report Writing; Structure of a report; Types of reports.			4
	Non-verbal Communication and Body Language: Forms of non-verbal communication; Interpreting body-language cues; Kinesics; Proxemics; Chronemics; Effective use of body language	3		
	Interview Skills: Types of Interviews; Ensuring success in job interviews; Appropriate use of non-verbal communication, Group Discussion: Differences between group discussion and debate; Ensuring success in group discussions, Presentation Skills: Oral presentation and public speaking skills; business presentations, Technology-based Communication: Netiquettes: effective e-mail messages; power-point presentation; enhancing editing skills using computer software.		4	
II	Need for Creativity in the 21 st century, Imagination, Intuition, Experience, Sources of Creativity, Lateral Thinking, Myths of creativity	2		

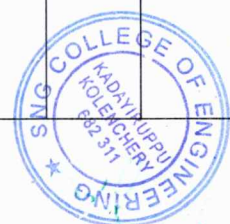


A. H. M.

	<p>Critical thinking Vs Creative thinking, Functions of Left Brain & Right brain, Convergent & Divergent Thinking, Critical reading & Multiple Intelligence.</p> <p>Steps in problem solving, Problem Solving Techniques, Problem Solving through Six Thinking Hats, Mind Mapping, Forced Connections.</p> <p>Problem Solving strategies, Analytical Thinking and quantitative reasoning expressed in written form, Numeric, symbolic, and graphic reasoning, Solving application problems.</p>		2	
		2		
			2	
III	<p>Introduction to Groups and Teams, Team Composition, Managing Team Performance, Importance of Group, Stages of Group, Group Cycle, Group thinking, getting acquainted, Clarifying expectations.</p> <p>Group Problem Solving, Achieving Group Consensus.</p> <p>Group Dynamics techniques, Group vs Team, Team Dynamics, Teams for enhancing productivity, Building & Managing Successful Virtual Teams. Managing Team Performance & Managing Conflict in Teams.</p> <p>Working Together in Teams, Team Decision-Making, Team Culture & Power, Team Leader Development.</p>	3		
			2	
		3		
			2	
IV	<p>Morals, Values and Ethics, Integrity, Work Ethic, Service Learning, Civic Virtue, Respect for Others, Living Peacefully.</p> <p>Caring, Sharing, Honesty, Courage, Valuing Time, Cooperation, Commitment, Empathy, Self-Confidence, Character,</p> <p>Spirituality, Senses of 'Engineering Ethics', variety of moral issued, Types of inquiry, moral dilemmas, moral autonomy, Kohlberg's theory, Gilligan's theory, Consensus and controversy, Models of Professional Roles, Theories about right action, Self-interest, customs and religion, application of ethical theories.</p> <p>Engineering as experimentation, engineers as responsible experimenters, Codes of ethics, Balanced outlook on.</p> <p>The challenger case study, Multinational corporations, Environmental ethics, computer ethics,</p> <p>Weapons development, engineers as managers, consulting</p>	3		
			2	
		3		
			2	

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	engineers, engineers as expert witnesses and advisors, moral leadership, sample code of Ethics like ASME, ASCE, IEEE, Institution of Engineers(India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers(IETE), India, etc.	3		
V	Introduction, a framework for considering leadership, entrepreneurial and moral leadership, vision, people selection and development, cultural dimensions of leadership, style, followers, crises.	4		
	Growing as a leader, turnaround leadership, gaining control, trust, managing diverse stakeholders, crisis management		2	
	Implications of national culture and multicultural leadership Types of Leadership, Leadership Traits.	2		
	Leadership Styles, VUCA Leadership, DART Leadership, Transactional vs Transformational Leaders, Leadership Grid, Effective Leaders, making of a Leader, Formulate Leadership		2	
END SEMESTER EXAM				

EVALUATION SCHEME

Internal Evaluation

(Conducted by the College)

Total Marks: 100

Part – A

(To be started after completion of Module 1 and to be completed by 30th working day of the semester)

- Group Discussion – Create groups of about 10 students each and engage them on a GD on a suitable topic for about 20 minutes. Parameters to be used for evaluation is as follows;

- | | | | |
|-------|------------------------|---|----------|
| (i) | Communication Skills | – | 10 marks |
| (ii) | Subject Clarity | – | 10 marks |
| (iii) | Group Dynamics | - | 10 marks |
| (iv) | Behaviors & Mannerisms | - | 10 marks |

(Marks: 40)

Part – B

(To be started from 31st working day and to be completed before 60th working day of the semester)

- Presentation Skills – Identify a suitable topic and ask the students to prepare a presentation (preferably a power point presentation) for about 10 minutes. Parameters to be used for evaluation is as follows;

- | | | | |
|-----|-----------------------|---|----------|
| (i) | Communication Skills* | - | 10 marks |
|-----|-----------------------|---|----------|

A. S. S.



- (ii) Platform Skills** - 10 marks
(iii) Subject Clarity/Knowledge - 10 marks

(Marks: 30)

* Language fluency, audibility, voice modulation, rate of speech, listening, summarizes key learnings etc.

** Postures/Gestures, Smiles/Expressions, Movements, usage of floor area etc.

Part – C

(To be conducted before the termination of semester)

3. Sample Letter writing or report writing following the guidelines and procedures. Parameters to be used for evaluation is as follows;

- (i) Usage of English & Grammar - 10 marks
(ii) Following the format - 10 marks
(iii) Content clarity - 10 marks

(Marks : 30)

External E valuation

(Conducted by the University)

Total Marks: 50

Time: 2 hrs.

Part – A


Short Answer questions

There will be one question from each area (five questions in total) will be asked for the examination. Each question should be written in about maximum of 400 words. Parameters to be used for evaluation are as follows;

- (i) Content Clarity/Subject Knowledge
(ii) Presentation style
(iii) Organization of content

(Marks: 5 x 6 = 30)




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Part – B

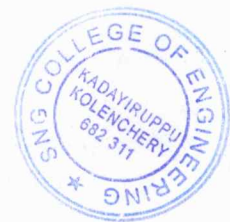
Case Study

The students will be given a case study with questions at the end the students have to analyze the case and answer the question at the end. Parameters to be used for evaluation are as follows;

- (i) Analyze the case situation
- (ii) Key players/characters of the case
- (iii) Identification of the problem (both major & minor if exists)
- (iv) Bring out alternatives
- (v) Analyze each alternative against the problem

- (vi) Choose the best alternative
- (vii) Implement as solution
- (viii) Conclusion
- (ix) Answer the question at the end of the case


(Marks: 1 x 20 =
20)



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Course code	Course Name	L-T-P - Credits	Year of Introduction
HS300	Principles of Management	3-0-0-3	2016
Prerequisite : Nil			
<p>Course Objectives</p> <p>To develop ability to critically analyse and evaluate a variety of management practices in the contemporary context;</p> <p>To understand and apply a variety of management and organisational theories in practice;</p> <p>To be able to mirror existing practices or to generate their own innovative management competencies, required for today's complex and global workplace;</p> <p>To be able to critically reflect on ethical theories and social responsibility ideologies to create sustainable organisations.</p>			
<p>Syllabus</p> <p>Definition, roles and functions of a manager, management and its science and art perspectives, management challenges and the concepts like, competitive advantage, entrepreneurship and innovation. Early contributors and their contributions to the field of management. Corporate Social Responsibility. Planning, Organizing, Staffing and HRD functions, Leading and Controlling. Decision making under certainty, uncertainty and risk, creative process and innovation involved in decision making.</p>			




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Expected outcome

A student who has undergone this course would be able to

- i. manage people and organisations
- ii. critically analyse and evaluate management theories and practices
- iii. plan and make decisions for organisations
- iv. do staffing and related HRD functions

Text Book:

Harold Koontz and Heinz Weirich, *Essentials of Management*, McGraw Hill Companies, 10th Edition.

References:

1. Daft, *New era Management*, 11th Edition, Cengage Learning
2. Griffin, *Management Principles and Applications*, 10th Edition, Cengage Learning
3. Heinz Weirich, Mark V Cannice and Harold Koontz, *Management: a Global, Innovative and Entrepreneurial Perspective*, McGraw Hill Education, 14th Edition
- Peter F Drucker, *The Practice of Management*, McGraw Hill, New York
- Robbins and Coulter, *Management*, 13th Edition, 2016, Pearson Education



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Course Plan			
Module	Contents	Hours	Sem. Exam Marks
I	Introduction to Management: definitions, managerial roles and functions; Science or Art perspectives- External environmentglobal, innovative and entrepreneurial perspectives of Management (3 Hrs.)- Managing people and organizations in the context of New Era- Managing for competitive advantage - the Challenges of Management (3 Hrs.)	6	15%

II	Early Contributions and Ethics in Management: Scientific Management- contributions of Taylor, Gilbreths, Human Relations approach-contributions of Mayo, McGregor's Theory, Ouchi's Theory Z (3 Hrs.) Systems Approach, the Contingency Approach, the Mckinsey 7-S Framework Corporate Social responsibility- Managerial Ethics. (3 Hrs)	6	15%
FIRST INTERNAL EXAMINATION			
III	Planning: Nature and importance of planning, -types of plans (3 Hrs.)- Steps in planning, Levels of planning - The Planning Process. – MBO (3 Hrs.).	6	15%
IV	Organising for decision making: Nature of organizing, organization levels and span of control in management Organisational design and structure –departmentation, line and staff concepts (3 Hrs.) Limitations of decision making- Evaluation and selecting from alternatives- programmed and non programmed decisions - decision under certainty, uncertainty and risk-creative process and innovation (3 Hrs.)	6	15%
SECOND INTERNAL EXAMINATION			

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Staffing and related HRD Functions : definition, Empowerment, staff – delegation, decentralization and recentralisation of authority – Effective Organizing and culture-responsive organizations – Global and entrepreneurial organizing (3 Hrs.) Manager inventory chart -matching person with the job -system approach to selection (3 Hrs.) Job design skills and personal characteristics needed in managers selection process, techniques and instruments (3 Hrs.)

V

9 20%

Leading and Controlling: Leading Vs Managing – Trait approach and Contingency approaches to leadership - Dimensions of Leadership (3 Hrs.) - Leadership Behavior and styles – Transactional and Transformational Leadership (3 Hrs.) Basic control process- control as a feedback system – Feed Forward Control – Requirements for effective control – control techniques – Overall controls and preventive controls – Global controlling (3 Hrs.)

VI

9 20%

END SEMESTER EXAM

Question Paper Pattern Max.



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marks: 100, Time: 3 hours .

The question paper shall consist of three parts

Part A: 4 questions uniformly covering modules I and II. Each question carries 10 marks

Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part B : 4 questions uniformly covering modules III and IV. Each question carries 10 marks

Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part C: 6 questions uniformly covering modules V and VI. Each question carries 10 marks Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

Note: In all parts, each question can have a maximum of four sub questions, if needed.

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Course Code	Course Name	L-T-P-Credits	Year of Introduction
CE402	ENVIRONMENTAL ENGINEERING – II	3-0-0-3	2016

Prerequisites: CE405 Environmental Engineering- I

Course objectives:

- To understand the various sources and characteristics of wastewater
- To know the various treatment methods available for wastewater treatment

Syllabus : Wastewater, sources, characteristics, oxygen demand Design of sewers, Circular sewers, Partial flow and full flow conditions. Sewer appurtenances, Disposal of wastewater, Streeter Phelps equation, Oxygen sag curve, Treatment methods, Aerobic and anaerobic methods, Design of various treatment units-Screening, Grit chamber, Sedimentation tank, Activated Sludge process, Trickling filter, Rotating biological contactor, Septic tanks, Imhoff tanks, Oxidation ditches, Oxidation ponds, Upflow anaerobic sludge blanket reactors, Sludge digestion, Sludge drying bed.

Course Outcomes:

The students will

- have an understanding of the various types of treatment methods for wastewater
- know the design aspects of various treatment units in a wastewater treatment plant.

Text Books

1. B.C Punmia , “Waste Water Engineering”, Laxmi Publications Pvt. Ltd, 2012
2. Howard S Peavy, Donald R Rowe, George Tchobanoglous, Environmental Engineering, Mc Graw Hill Education, 1984
3. P N Modi, “Sewage Treatment & Disposal and Waste water Engineering”, Standard Book House, NewDelhi, 2e, 2008.
4. S.K. Garg , “Sewage disposal and Air pollution Engineering”, Khanna Publishers, 2008
5. G S Birdie, Water Supply and Engineering, Dhanpat Rai Publishing Company, 2014

References

1. G. L. Karia, R.A. Christian, Wastewater treatment: Concepts And Design Approach, PHI learning Pvt Ltd, 2013
2. J. Arceivala, Shyam R. Asolekar, Wastewater Treatment for Pollution Control and Reuse, McGrawhill Education, 2007
3. K N Duggal, Elements of Environmental Engineering, S Chand Publications, 2007
4. Mackenzie L Davis, Introduction to Environmental Engineering, McGraw Hill Education (India), 5e, 2012
5. Metcalf and Eddy, “Waste Water Engineering”, Tata McGraw Hill publishing Co Ltd, 2003

COURSE PLAN

Module	Contents	Hours	Sem. Exam Marks %
I	Wastewater- Sources and flow rates, Domestic wastewater, Estimation of quantity of wastewater, Dry weather flow, storm water flow, Time of concentration Sewers, Design of circular sewers under full and partial flow	6	15



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	conditions		
II	Sewer appurtenances-Man holes, Catch basin, flushing devices, Inverted siphon. Ventilation of sewers. Sewage, Sewerage, Systems of sewerage Sewage characteristics- Physical, chemical and biological parameters, Biological oxygen demand, first stage BOD, Chemical oxygen demand, Relative stability, Population equivalent.	7	15
FIRST INTERNAL EXAMINATION			
III	Waste water disposal systems- Self purification of streams, Dilution -Oxygen sag curve, Streeter Phelp's Equation, land treatment Treatment of sewage-Preliminary and Primary treatment -Theory and design of Screen, Grit chamber, Detritus chamber, Flow equalization tank and Sedimentation tank.	6	15
IV	Secondary treatment methods-Contact bed, Intermittent sand filter, Theory and design of Trickling filter, Activated sludge process, Trickling filter-High rate, standard. Rotating biological contactor	7	15
SECOND INTERNAL EXAMINATION			
V	Design of Septic tank and Imhoff tank, Principle and working of Oxidation ditch and oxidation ponds. Aerated lagoons, Design of upflow anaerobic sludge blanket reactors	8	20
VI	Sludge treatment and disposal-Methods of thickening, Sludge digestion- Anaerobic digestion, Design of sludge digestion tanks and Sludge drying beds, methods of sludge disposal	8	20
END SEMESTER EXAMINATION			

• **EXTERNAL EVALUATION:**

Maximum Marks :100

Exam Duration: 3 Hrs

QUESTION PAPER PATTERN (External Evaluation) :

Part A -Module I & II : 2 questions out of 3 questions carrying 15 marks each

Part B - Module III & IV: 2 questions out of 3 questions carrying 15 marks each

Part C - Module V & VI : 2 questions out of 3 questions carrying 20 marks each

Note : 1.Each part should have at least one question from each module

2.Each question can have a maximum of 4 subdivisions (a,b,c,d)


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Course Code	Course Name	L-T-P-Credits	Year of Introduction
CE405	ENVIRONMENTAL ENGINEERING- I	3-0-0-3	2016

Pre-requisites: CE203 Fluid Mechanics -I

Course objectives:

- To study the significance of water resources and the factors affecting the quality and quantity of water
- To study the various types of treatment techniques adopted for a public water supply system

Syllabus :

Water sources, demand, factors, Quantity estimation, Population forecasting, Quality of water. Water treatment- Physical methods, Chemical methods. Design of sedimentation tank, flocculator, clariflocculator, filters, Membrane treatment techniques. Disinfection- methods. Distribution of water, Pumps, Hardy Cross method of analysis

Expected Outcomes:

The students will

- become aware of the various pollutants affecting water quality
- know about the different treatment units available in a water treatment plant and their design procedures

Text Books:

- B.C Punmia, "Water Supply Engineering", Laxmi Publications Pvt. Ltd., 2016
- G S Birdie, Water Supply and Engineering, Dhanapat Rai Publishing Company, 2014
- P.N. Modi, "Water Supply Engineering", Standard Book House, NewDelhi
- Peavy H S, Rowe, D.R. Tchobanaglou "Environmental Engineering" Mc GrawHill Education, 1984
- S.K.Garg, "Water Supply Engineering", Khanna Publishers. 2010

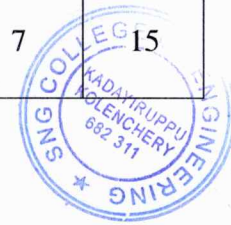
References

- K N Dugal, Elements of Environmental Engineering, S Chand and Company Pvt Ltd, 2007
- Mackenzie L Davis, Introduction to Environmental Engineering, McGrawhill Education (India), 2012
- Metcalf & Eddy , "Waste Water Engineering", Tata Mc Grawhill Publishing Co Ltd, 2003
- P Venugopala Rao, Environmental Engineering, PHI Learning Pvt Ltd, 2002
- Subhash Verma, Varinder Kanwar, Siby John, Water supply Engineering, Vikash Publishing, 2015

COURSE PLAN

Module	Contents	Hours	Sem. Exam Marks %
I	Introduction of environment- sources of water supply-Water demand, quantification of water demand through population forecasting – Factors affecting consumption-Fluctuations in demand	7	15

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II	Types of intakes-Conveyors, pumps and location of pumping station- Quality of water - Drinking water standards - Physical, chemical and biological analysis.	6	15
FIRST INTERNAL EXAMINATION			
III	Treatment of water-Theory and principles of Sedimentation tanks- Stoke's law-Types of settling (Type I & Type II only)-Coagulation- Mixing-Flocculation, Design of Sedimentation tanks (circular and rectangular)-Clariflocculators	7	15
IV	Filtration-Types of filters- Working and Design of Rapid and Slow sand filters. Loss of head in filters, Pressure filters	7	15
SECOND INTERNAL EXAMINATION			
V	Disinfection of water - Methods, Chlorination-Types, Factors affecting - Chlorine demands. Miscellaneous treatment-Ion exchange, Lime-soda process, Electro dialysis - Colour, Taste and Odour removal-Adsorption-Aeration-Fluoridation-Defluoridation	7	20
VI	Lay out of water distribution network-Methods of distribution-Hardy cross method-Equivalent pipe method-Pipe appurtenances.	8	20
END SEMESTER EXAMINATION			

QUESTION PAPER PATTERN (End semester examination)

Maximum Marks :100

Exam Duration: 3 Hrs

Part A -Module I & II : 2 questions out of 3 questions carrying 15 marks each

Part B - Module III & IV: 2 questions out of 3 questions carrying 15 marks each

Part C - Module V & VI: 2 questions out of 3 questions carrying 20 marks each

Note :

1. Each part should have at least one question from each module
2. Each question can have a maximum of 4 subdivisions (a, b, c, d)



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Course Code	Course Name	L-T-P-Credits	Year of Introduction
CE469	ENVIRONMENTAL IMPACT ASSESSMENT	3-0-0-3	2016

Prerequisites: Nil

Course objectives:

- To know the various types of environmental pollution
- To make aware the impact due to various types of pollutants and their assessment technique

Syllabus : Pollution, Types. Air pollution-sources, effects, types of pollutants. Water pollution, characteristics of water pollutants, Solid wastes, sources, types, soil pollution, pesticide pollution. Noise pollution, Impacts, positive and negative Environmental impact assessment, steps of doing EIA, methodology adopted, EIA procedure in India, Case studies.

Expected Outcomes:

- The students will gain basic knowledge of various pollution sources and their impacts

Text Books / References:

1. A K Srivastava, Environment impact Assessment, APH Publishing, 2014
2. John Glasson, Riki Therivel & S Andrew Chadwick "Introduction to EIA" University College London Press Limited, 2011
3. Larry W Canter, "Environmental Impact Assessment", McGraw Hill Inc. , New York, 1995.
4. Ministry of Environment & Forests, Govt. of India 2006 EIA Notification
5. Rau G J and Wooten C.D "EIA Analysis Hand Book" Mc Graw Hill
6. Robert A Corbett "Standard Handbook of Environmental Engineering" McGraw Hill, 1999.

COURSE PLAN

Module	Contents	Hours	Sem. Exam Marks %
I	INTRODUCTION: Classification of Pollution and Pollutants, – Evolution of EIA (Global and Indian Scenario)- Elements of EIA — Screening – Scoping - Public Consultation - Environmental Clearance process in India - Key Elements in 2006 EIA(Govt. of India) Notification	6	15
II	AIR POLLUTION: Primary and Secondary Types of Pollutants, sulfur dioxide- nitrogen dioxide, carbon monoxide, WATER POLLUTION: Point and Non-point Source of Pollution, Major Pollutants of Water, Impact of pollutants	6	15
FIRST INTERNAL EXAMINATION			
III	SOLID WASTE: Classification and sources of Solid Waste, Characteristics, effects, e waste, : Effects of urbanization on land degradation, pesticide pollution NOISE POLLUTION: Sources of Noise, Effects of Noise,	7	15



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	Control measures		
IV	Impacts of pollutants, types, scale of impact-Global, local pollutants. Climate change, Ozone layer depletion, Deforestation, land degradation , Impact of development on vegetation and wild life	7	15,
SECOND INTERNAL EXAMINATION			
V	Socio-economic impacts - Impact assessment Methodologies- Overlays, Checklist, Matrices, Fault Tree Analysis, Event Tree Analysis- Role of an Environmental Engineer- Public Participation	8	20
VI	Standards for Water, Air and Noise Quality - Environmental Management Plan- EIA- Case studies of EIA	8	20
END SEMESTER EXAMINATION			

QUESTION PAPER PATTERN (External Evaluation) :

Maximum Marks :100

Exam Duration: 3 Hrs

Part A -Module I & II : 2 questions out of 3 questions carrying 15 marks each

Part B - Module III & IV: 2 questions out of 3 questions carrying 15 marks each

Part C - Module V & VI : 2 questions out of 3 questions carrying 20 marks each

Note : 1.Each part should have at least one question from each module

2.Each question can have a maximum of 4 subdivisions (a, b, c, d)

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Course Code	Course Name	L-T-P-Credits	Year of Introduction
CE488	DISASTER MANAGEMENT	3-0-0-3	2016

Course Objectives

- To provide an overview of the common hazards and their dynamics
- To inculcate the basic concepts of disaster management

Syllabus

Fundamental concepts of hazards and disasters - Basic concept of Earth as a system and its component sub systems - . Climate Change - Introduction to key concepts and terminology of hazard, vulnerability, exposure, risk, crisis, emergencies, Disasters, Resilience - Natural Disasters - Earth quakes, Landslides. Floods, Coastal disasters, Tidal waves, Tsunamis. Nature of Impacts - Anthropogenic Disasters – Soil degradation and desertification -water and atmospheric pollution -Hazard and disaster management plans for floods, tidal waves.

Expected Outcome

The students will

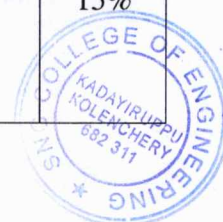
- get general ideas about the processes involved in natural and anthropogenic disasters
- understand the concepts of disaster management and measures to mitigate and contain common episodes of disasters

References:

- Andrew, S., "Environmental Modeling with GIS and Remote Sensing", John Willey and sons, 2002
- Ariyabandu, M. and Sahni P. (Eds), "Disaster Risk Reduction in South Asia", Prentice-Hall (India), 2003.
- Bell, F.G., "Geological Hazards: Their assessment, avoidance and mitigation", E & FN SPON Routledge, London. 1999
- Bossler, J.D., "Manual of Geospatial Science and Technology", Taylor and Francis, London, 2001
- David Alexander, "Natural Disasters", Research Press, New Delhi, 1993
- Matthews, J.A., "Natural hazards and Environmental Change", Bill McGuire, Ian Mason, 2002
- Nick Carter. W., "Disaster Management - A Disaster Manager's Handbook". Asian Development Bank, Philippines. 1991
- United Nations , Mitigating Natural Disasters, Phenomena, Effects and options, A Manual for policy makers and planners, New York, 1991

COURSE PLAN

Module	Contents	Hours	End Sem. Exam Marks
I	Fundamental concepts of hazards and disasters: Introduction to key concepts and terminology of hazard, vulnerability, exposure, risk, crisis, emergencies, Disasters, Resilience. Basic concept of Earth as a system and its component sub systems. Climate Change vis-a-vis the interrelationships of the subsystems- Green House Effect and Global warming, basic	7	15%



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	ideas about their causes and effects.		
II	Types of Natural Disasters I- Earth quakes, Landslides. Nature of impacts.	7	15%
FIRST INTERNAL EXAMINATION			
III	Types of Natural Disasters II- Floods, Coastal disasters- Cyclones, Tsunamis. Nature of impacts.	7	15%
IV	Types of Anthropogenic Disasters I- soil and soil degradation, desertification.	7	15%
SECOND INTERNAL EXAMINATION			
V	Types of Anthropogenic Disasters II- Fundamental concepts of water and atmospheric pollution.	7	20%
VI	Hazard and disaster management plans for floods, tidal waves.	7	20%
END SEMESTER EXAMINATION			

QUESTION PAPER PATTERN (End Semester Examination)

Maximum Marks :100

Exam Duration: 3 Hrs

Part A -Module I & II : 2 questions out of 3 questions carrying 15 marks each

Part B - Module III & IV: 2 questions out of 3 questions carrying 15 marks each

Part C - Module V & VI: 2 questions out of 3 questions carrying 20 marks each

Note : 1.Each part should have at least one question from each module

2.Each question can have a maximum of 4 subdivisions (a,b,c,d)

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CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT
MCN202	CONSTITUTION OF INDIA		2	0	0	NIL

Preamble:

The study of their own country constitution and studying the importance environment as well as understanding their own human rights help the students to concentrate on their day to day discipline. It also gives the knowledge and strength to face the society and people.

Prerequisite: Nil

Course Outcomes: After the completion of the course the student will be able to

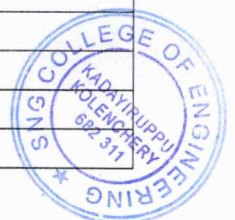
CO 1	Explain the background of the present constitution of India and features.
CO 2	Utilize the fundamental rights and duties.
CO 3	Understand the working of the union executive, parliament and judiciary.
CO 4	Understand the working of the state executive, legislature and judiciary.
CO 5	Utilize the special provisions and statutory institutions.
CO 6	Show national and patriotic spirit as responsible citizens of the country

Mapping of course outcomes with program outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1						2	2	2		2		
CO 2						3	3	3		3		
CO 3						3	2	3		3		
CO 4						3	2	3		3		
CO 5						3	2	3		3		
CO 6						3	3	3		2		

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		End Semester Examination
	1	2	
Remember	20	20	40
Understand	20	20	40
Apply	10	10	20
Analyse			



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Evaluate			
Create			

Mark distribution

Total Marks	CIE	ESE	ESE Duration
150	50	100	3 hours

Continuous Internal Evaluation Pattern:

Attendance	: 10 marks
Continuous Assessment Test (2 numbers)	: 25 marks
Assignment/Quiz/Course project	: 15 marks

End Semester Examination Pattern: There will be two parts; Part A and Part B. Part A contain 10 questions with 2 questions from each module, having 3 marks for each question. Students should answer all questions. Part B contains 2 questions from each module of which student should answer any one. Each question can have maximum 2 sub-divisions and carry 14 marks.

Course Level Assessment Questions

Course Outcome 1 (CO1):

- 1 Discuss the historical background of the Indian constitution.
- 2 Explain the salient features of the Indian constitution.
- 3 Discuss the importance of preamble in the implementation of constitution.

Course Outcome 2 (CO2)

- 1 What are fundamental rights ? Examine each of them.
- 2 Examine the scope of freedom of speech and expression underlying the constitution.
- 3 The thumb impression of an accused is taken by the police against his will. He contends that this is a violation of his rights under Art 20(3) of the constitution. Decide.

Course Outcome 3(CO3):

- 1 Explain the powers of the President to suspend the fundamental rights during emergency.


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2 Explain the salient features of appeal by special leave.

3. List the constitutional powers of President.

Course Outcome 4 (CO4):

1 Discuss the constitutional powers of Governor.

2 Examine the writ jurisdiction of High court.

3 Discuss the qualification and disqualification of membership of state legislature.

Course Outcome 5 (CO5):

1 Discuss the duties and powers of comptroller of auditor general.

2 Discuss the proclamation of emergency.

3 A state levies tax on motor vehicles used in the state, for the purpose of maintaining roads in the state. X challenges the levy of the tax on the ground that it violates the freedom of interstate commerce guaranteed under Art 301. Decide.

Course Outcome 6 (CO6):

1 Explain the advantages of citizenship.

2 List the important principles contained in the directive principles of state policy.

3 Discuss the various aspects contained in the preamble of the constitution



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Syllabus

Module 1 Definition, historical back ground, features, preamble, territory, citizenship.

Module 2 State, fundamental rights, directive principles, duties.

Module 3 The machinery of the union government.

Module 4 Government machinery in the states

Module 5 The federal system, Statutory Institutions, miscellaneous provisions.

Text Books

1 D D Basu, Introduction to the constitution of India, Lexis Nexis, New Delhi, 24e, 2019

2 PM Bhakshi, The constitution of India, Universal Law, 14e, 2017

Reference Books

1 Ministry of law and justice, The constitution of India, Govt of India, New Delhi, 2019.

2 JN Pandey, The constitutional law of India, Central Law agency, Allahabad, 51e, 2019

3 MV Pylee, India's Constitution, S Chand and company, New Delhi, 16e, 2016

Course Contents and Lecture Schedule

No	Topic	No. of Lectures
1	Module 1	
1.1	Definition of constitution, historical back ground, salient features of the constitution.	1
1.2	Preamble of the constitution, union and its territory.	1
1.3	Meaning of citizenship, types, termination of citizenship.	2
2	Module 2	
2.1	Definition of state, fundamental rights, general nature, classification, right to equality ,right to freedom , right against exploitation	2

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2.2	Right to freedom of religion, cultural and educational rights, right to constitutional remedies. Protection in respect of conviction for offences.	2
2.3	Directive principles of state policy, classification of directives, fundamental duties.	2
3	Module 3	
3.1	The Union executive, the President, the vice President, the council of ministers, the Prime minister, Attorney-General, functions.	2
3.2	The parliament, composition, Rajya sabha, Lok sabha, qualification and disqualification of membership, functions of parliament.	2
3.3	Union judiciary, the supreme court, jurisdiction, appeal by special leave.	1
4	Module 4	
4.1	The State executive, the Governor, the council of ministers, the Chief minister, advocate general, union Territories.	2
4.2	The State Legislature, composition, qualification and disqualification of membership, functions.	2
4.3	The state judiciary, the high court, jurisdiction, writs jurisdiction.	1
5	Module 5	
5.1	Relations between the Union and the States, legislative relation, administrative relation, financial Relations, Inter State council, finance commission.	1
5.2	Emergency provision, freedom of trade commerce and inter course, comptroller and auditor general of India, public Services, public service commission, administrative Tribunals.	2
5.3	Official language, elections, special provisions relating to certain classes, amendment of the Constitution.	2

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Sl no	Course Name	Course Code	Semester in which course is offered
1	Sustainable Engineering	MCN 201	3
2	Constitution of India	MCN 201	4
3	Disaster Management	MCN 301	5
4	Design Engineering	EST200	4
5	Industrial Economics and Foreign Trade	HUT 300	5
6	Management for Engineers	HUT 310	6

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MCN 301	DISASTER MANAGEMENT	Category	L	T	P	CREDIT	YEAR OF INTRODUCTION
		Non - Credit	2	0	0	Nil	2019

Preamble: The objective of this course is to introduce the fundamental concepts of hazards and disaster management.

Prerequisite: Nil

Course Outcomes: After the completion of the course the student will be able to

CO1	Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle (Cognitive knowledge level: Understand).
CO2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment (Cognitive knowledge level: Understand).
CO3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk (Cognitive knowledge level: Understand).
CO4	Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community (Cognitive knowledge level: Apply)
CO5	Identify factors that determine the nature of disaster response and discuss the various disaster response actions (Cognitive knowledge level: Understand).
CO6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level (Cognitive knowledge level: Understand).



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Assessment Pattern

Bloom's Category	Continuous Assessment Tests		End Semester Examination Marks
	Test 1 (Marks)	Test 2 (Marks)	
Remember	10	10	20
Understand	25	25	50
Apply	15	15	30
Analyze			
Evaluate			
Create			

Mark Distribution

Total Marks	CIE Marks	ESE Marks	ESE Duration
150	50	100	3 hours

Continuous Internal Evaluation Pattern:

Attendance : 10 marks

Continuous Assessment - Test : 25 marks

Continuous Assessment - Assignment : 15 marks

Internal Examination Pattern:

Each of the two internal examinations has to be conducted out of 50 marks. First series test shall be preferably conducted after completing the first half of the syllabus and the second series test shall be preferably conducted after completing remaining part of the syllabus. There will be two parts: Part A and Part B. Part A contains 5 questions (preferably, 2 questions each from the completed modules and 1 question from the partly completed module), having 3 marks for each question adding up to 15 marks for part A. Students should answer all questions from Part A.

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Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		2				2				2		2
CO2	2	3	2		2	2	3			3		2
CO3	2	3	2	2	2	2	3			3		2
CO4	3	3	3		2	2	3					2
CO5	3	3			2	2	3					2
CO6	3					2	3	3				2

Abstract POs defined by National Board of Accreditation			
PO#	Broad PO	PO#	Broad PO
PO1	Engineering Knowledge	PO7	Environment and Sustainability
PO2	Problem Analysis	PO8	Ethics
PO3	Design/Development of solutions	PO9	Individual and team work
PO4	Conduct investigations of complex problems	PO10	Communication
PO5	Modern tool usage	PO11	Project Management and Finance
PO6	The Engineer and Society	PO12	Life long learning




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Part B contains 7 questions (preferably, 3 questions each from the completed modules and 1 question from the partly completed module), each with 7 marks. Out of the 7 questions, a student should answer any 5.

End Semester Examination Pattern:

There will be two parts; Part A and Part B. Part A contains 10 questions with 2 questions from each module, having 3 marks for each question. Students should answer all questions. Part B contains 2 questions from each module of which a student should answer any one. Each question can have maximum 2 sub-divisions and carries 14 marks.



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SYLLABUS

MCN 301 Disaster Management

Module 1

Systems of earth

Lithosphere- composition, rocks, soils; Atmosphere-layers, ozone layer, greenhouse effect, weather, cyclones, atmospheric circulations, Indian Monsoon; hydrosphere- Oceans, inland water bodies; biosphere

Definition and meaning of key terms in Disaster Risk Reduction and Management- disaster, hazard, exposure, vulnerability, risk, risk assessment, risk mapping, capacity, resilience, disaster risk reduction, disaster risk management, early warning systems, disaster preparedness, disaster prevention, disaster mitigation, disaster response, damage assessment, crisis counselling, needs assessment.

Module 2

Hazard types and hazard mapping; Vulnerability types and their assessment- physical, social, economic and environmental vulnerability.

Disaster risk assessment –approaches, procedures

Module 3

Disaster risk management -Core elements and phases of Disaster Risk Management

Measures for Disaster Risk Reduction – prevention, mitigation, and preparedness.

Disaster response- objectives, requirements; response planning; types of responses.

Relief; international relief organizations.

Module 4

Participatory stakeholder engagement; Disaster communication- importance, methods, barriers; Crisis counselling

Capacity Building: Concept – Structural and Non-structural Measures, Capacity Assessment; Strengthening Capacity for Reducing Risk



Module 5

Common disaster types in India; Legislations in India on disaster management; National disaster management policy; Institutional arrangements for disaster management in India.

The Sendai Framework for Disaster Risk Reduction- targets, priorities for action, guiding principles

Reference Text Book

1. R. Subramanian, Disaster Management, Vikas Publishing House, 2018
2. M. M. Sulphery, Disaster Management, PHI Learning, 2016
3. UNDP, Disaster Risk Management Training Manual, 2016
4. United Nations Office for Disaster Risk Reduction, Sendai Framework for Disaster Risk Reduction 2015-2030, 2015

Sample Course Level Assessment Questions

Course Outcome 1 (CO1):

1. What is the mechanism by which stratospheric ozone protects earth from harmful UV rays?
2. What are disasters? What are their causes?
3. Explain the different types of cyclones and the mechanism of their formation
4. Explain with examples, the difference between hazard and risk in the context of disaster management
5. Explain the following terms in the context of disaster management (a) exposure (b) resilience (c) disaster risk management (d) early warning systems, (e) damage assessment (f) crisis counselling (g) needs assessment

Course Outcome 2 (CO2):

1. What is hazard mapping? What are its objectives?
2. What is participatory hazard mapping? How is it conducted? What are its advantages?
3. Explain the applications of hazard maps
4. Explain the types of vulnerabilities and the approaches to assess them

Course Outcome 3 (CO3):

1. Explain briefly the concept of 'disaster risk'



2. List the strategies for disaster risk management 'before', 'during' and 'after' a disaster
3. What is disaster preparedness? Explain the components of a comprehensive disaster preparedness strategy

Course Outcome 4 (CO4):

1. What is disaster prevention? Distinguish it from disaster mitigation giving examples
2. What are the steps to effective disaster communication? What are the barriers to communication?
3. Explain capacity building in the context of disaster management

Course Outcome 5 (CO5):

1. Briefly explain the levels of stakeholder participation in the context of disaster risk reduction
2. Explain the importance of communication in disaster management
3. Explain the benefits and costs of stakeholder participation in disaster management
4. How are stakeholders in disaster management identified?

Course Outcome 6 (CO6):

1. Explain the salient features of the National Policy on Disaster Management in India
2. Explain the guiding principles and priorities of action according to the Sendai Framework for Disaster Risk Reduction
3. What are Tsunamis? How are they caused?
4. Explain the earthquake zonation of India

After



Model Question paper

QP CODE:

PAGES:3

Reg No: _____

Name : _____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FIFTH SEMESTER B.TECH DEGREE EXAMINATION, MONTH & YEAR

Course Code: MCN 301

Course Name: Disaster Management

Max.Marks:100

Duration: 3 Hours

PART A

Answer all Questions. Each question carries 3 Marks

1. What is the mechanism by which stratospheric ozone protects earth from harmful UV rays?
2. What are disasters? What are their causes?
3. What is hazard mapping? What are its objectives?
4. Explain briefly the concept of 'disaster risk'.
5. List the strategies for disaster risk management 'before', 'during' and 'after' a disaster
6. What is disaster prevention? Distinguish it from disaster mitigation giving examples
7. Briefly explain the levels of stakeholder participation in the context of disaster risk reduction
8. Explain the importance of communication in disaster management
9. What are Tsunamis? How are they caused?
10. Explain the earthquake zonation of India

Part B

Answer any one Question from each module. Each question carries 14 Marks

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11. a. Explain the different types of cyclones and the mechanism of their formation [10]
b. Explain with examples, the difference between hazard and risk in the context of disaster management [4]

OR

12. Explain the following terms in the context of disaster management [14]
(a) exposure (b) resilience (c) disaster risk management (d) early warning systems, (e) damage assessment (f) crisis counselling (g) needs assessment

13. a. What is participatory hazard mapping? How is it conducted? What are its advantages? [8]
b. Explain the applications of hazard maps [6]

OR

14. Explain the types of vulnerabilities and the approaches to assess them [14]
15. a. Explain the core elements of disaster risk management [8]
b. Explain the factors that decide the nature of disaster response [6]

OR

16. a. What is disaster preparedness? Explain the components of a comprehensive disaster preparedness strategy [6]
b. Explain the different disaster response actions [8]
17. a. Explain the benefits and costs of stakeholder participation in disaster management [10]
b. How are stakeholders in disaster management identified? [4]

OR

18. a. What are the steps to effective disaster communication? What are the barriers to communication?
b. Explain capacity building in the context of disaster management



19. Explain the salient features of the National Policy on Disaster Management in India

[14]

OR

20. Explain the guiding principles and priorities of action according to the Sendai Framework for Disaster Risk Reduction

[14]



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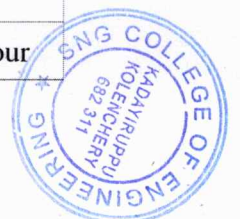
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Teaching Plan

Module 1		5 Hours
1.1	Introduction about various Systems of earth, Lithosphere-composition, rocks, Soils; Atmosphere-layers, ozone layer, greenhouse effect, weather	1 Hour
1.2	Cyclones, atmospheric circulations, Indian Monsoon; hydrosphere-Oceans, inland water bodies; biosphere	1 Hour
1.3	Definition and meaning of key terms in Disaster Risk Reduction and Management- disaster, hazard,	1 Hour
1.4	Exposure, vulnerability, risk, risk assessment, risk mapping, capacity, resilience, disaster risk reduction, Disaster risk management, early warning systems	1 Hour
1.5	Disaster preparedness, disaster prevention, disaster, Mitigation, disaster response, damage assessment, crisis counselling, needs assessment.	1 Hour
Module 2		5 Hours
2.1	Various Hazard types, Hazard mapping; Different types of Vulnerability types and their assessment	1 Hour
2.2	Vulnerability assessment and types, Physical and social vulnerability	1 Hour
2.3	Economic and environmental vulnerability, Core elements of disaster risk assessment	1 Hour
2.4	Components of a comprehensive disaster preparedness strategy approaches, procedures	1 Hour
2.5	Different disaster response actions	1 Hour
Module 3		5 Hours
3.1	Introduction to Disaster risk management, Core elements of Disaster Risk Management	1 Hour
3.2	Phases of Disaster Risk Management, Measures for Disaster Risk Reduction	1 Hour
3.3	Measures for Disaster prevention, mitigation, and preparedness.	1 Hour

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3.4	Disaster response- objectives, requirements. Disaster response planning; types of responses.	1 Hour
3.5	Introduction- Disaster Relief, Relief; international relief organizations.	1 Hour
Module 4		5 Hours
4.1	Participatory stakeholder engagement	1 Hour
4.2	Importance of disaster communication.	1 Hour
4.3	Disaster communication- methods, barriers. Crisis counselling	1 Hour
4.4	Introduction to Capacity Building. Concept – Structural Measures, Non-structural Measures.	1 Hour
4.5	Introduction to Capacity Assessment, Capacity Assessment; Strengthening, Capacity for Reducing Risk	1 Hour
Module 5		5 Hours
5.1	Introduction-Common disaster types in India.	1 Hour
5.2	Common disaster legislations in India on disaster management	1 Hour
5.3	National disaster management policy, Institutional arrangements for disaster management in India.	1 Hour
5.4	The Sendai Framework for Disaster Risk Reduction and targets	1 Hour
5.5	The Sendai Framework for Disaster Risk Reduction-priorities for action, guiding principles	1 Hour

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CODE	COURSE NAME	CATEGORY	L	T	P	CREDITS
EST 200	DESIGN AND ENGINEERING		2	0	0	2

Preamble:

The purpose of this course is to

- i) introduce the undergraduate engineering students the fundamental principles of design engineering.
- ii) make them understand the steps involved in the design process and
- iii) familiarize them with the basic tools used and approaches in design.

Students are expected to apply design thinking in learning as well as while practicing engineering, which is very important and relevant for today. Case studies from various practical situations will help the students realize that design is not only concerned about the function but also many other factors like customer requirements, economics, reliability, etc. along with a variety of life cycle issues.

The course will help students to consider aesthetics, ergonomics and sustainability factors in designs and also to practice professional ethics while designing.

Prerequisite:

Nil. The course will be generic to all engineering disciplines and will not require specialized preparation or prerequisites in any of the individual engineering disciplines.

Course Outcomes:

After the completion of the course the student will be able to

CO 1	Explain the different concepts and principles involved in design engineering.
CO 2	Apply design thinking while learning and practicing engineering.
CO 3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering.

Mapping of course outcomes with program outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	2	1					1			1		
CO 2		2				1		1				2
CO 3			2			1	1		2	2		1



Assessment Pattern

Continuous Internal Evaluation (CIE) Pattern:

Attendance	: 10 marks
Continuous Assessment Test (2 numbers)	: 25 marks
Assignment/Quiz/Course project	: 15 marks

End Semester Examination (ESE) Pattern: There will be two parts; Part A and Part B.

Part A : 30 marks

part B : 70 marks

Part A contains 10 questions with 2 questions from each module, having 3 marks for each question. Students should answer all questions.

Part B contains 2 case study questions from each module of which student should answer any one. Each question carry 14 marks and can have maximum 2 sub questions.

Mark distribution

Total Marks	CIE	ESE	ESE Duration
150	50	100	3 hours

Bloom's Category	Continuous Assessment Tests		End Semester Examination
	1	2	
Remember	5	5	10
Understand	10	10	20
Apply	35	35	70
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-



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Course Level Assessment Questions

Course Outcome 1 (CO1): Appreciate the different concepts and principles involved in design engineering.

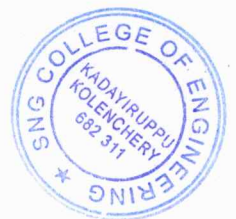
1. State how engineering design is different from other kinds of design
2. List the different stages in a design process.
3. Describe design thinking.
4. State the function of prototyping and proofing in engineering design.
5. Write notes on the following concepts in connection with design engineering 1) Modular Design, 2) Life Cycle Design , 3) Value Engineering, 4) Concurrent Engineering, and 5) Reverse Engineering
6. State design rights.

Course Outcome 2 (CO2) Apply design thinking while learning and practicing engineering.

1. Construct the iterative process for design thinking in developing simple products like a pen, umbrella, bag, etc.
2. Show with an example how divergent-convergent thinking helps in generating alternative designs and then how to narrow down to the best design.
3. Describe how a problem-based learning helps in creating better design engineering solutions.
4. Discuss as an engineer, how ethics play a decisive role in your designs

Course Outcome 3(CO3): Develop innovative, reliable, sustainable and economically viable designs incorporating different segments of knowledge in engineering.

1. Illustrate the development of any simple product by passing through the different stages of design process
2. Show the graphical design communication with the help of detailed 2D or 3D drawings for any simple product.
3. Describe how to develop new designs for simple products through bio-mimicry.



Model Question paper

Page 1 of 2

Reg No.: _____ Name: _____

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
THIRD/FOURTH SEMESTER B.TECH DEGREE
EXAMINATION**

Course Code: EST 200

Course Name: DESIGN AND ENGINEERING

Max. Marks: 100 Duration: 3

Hours PART A

**Answer all questions, each question carries 3
marks Use only hand sketches**

- (1) Write about the basic design process.
- (2) Describe how to finalize the design objectives.
- (3) State the role of divergent-convergent questioning in design thinking.
- (4) Discuss how to perform design thinking in a team managing the conflicts.
- (5) Show how engineering sketches and drawings convey designs.
- (6) Explain the role of mathematics and physics in design engineering process.
- (7) Distinguish between project-based learning and problem-based learning in design engineering.
- (8) Describe how concepts like value engineering, concurrent engineering and reverse engineering influence engineering designs?
- (9) Show how designs are varied based on the aspects of production methods, life span, reliability and environment?
- (10) Explain how economics influence the engineering designs?

(10x3 marks =30 marks)

Part B

**Answer any ONE question from each module. Each question carry 14
marks**

Module 1

- (11) Show the designing of a wrist watch going through the various stages of the design process. Use hand sketches to illustrate the processes.

or

- (12) Find the customer requirements for designing a new car showroom. Show how the design objectives were finalized considering the design constraints?



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Module 2

(13) Illustrate the design thinking approach for designing a bag for college students within a limited budget. Describe each stage of the process and the iterative procedure involved. Use hand sketches to support your arguments.

OR

(14) Construct a number of possible designs and then refine them to narrow down to the best design for a drug trolley used in hospitals. Show how the divergent-convergent thinking helps in the process. Provide your rationale for each step by using hand sketches only.

Module 3

(15) Graphically communicate the design of a thermo flask used to keep hot coffee. Draw the detailed 2D drawings of the same with design detailing, material selection, scale drawings, dimensions, tolerances, etc. Use only hand sketches.

OR

(16) Describe the role of mathematical modelling in design engineering. Show how mathematics and physics play a role in designing a lifting mechanism to raise 100 kg of weight to a floor at a height of 10 meters in a construction site.

Module 4

(17) Show the development of a nature inspired design for a solar powered bus waiting shed beside a highway. Relate between natural and man-made designs. Use hand sketches to support your arguments.

OR

(18) Show the design of a simple sofa and then depict how the design changes when considering 1) aesthetics and 2) ergonomics into consideration. Give hand sketches and explanations to justify the changes in designs.

Module 5

(19) Examine the changes in the design of a foot wear with constraints of 1) production methods, 2) life span requirement, 3) reliability issues and 4) environmental factors. Use hand sketches and give proper rationalization for the changes in design.

OR

(20) Describe the how to estimate the cost of a particular design using ANY of the following: i) a website, ii) the layout of a plant, iii) the elevation of a building, iv) an electrical or electronic system or device and v) a car.

Show how economics will influence the engineering designs. Use hand sketches to support your arguments.

(5x14 marks = 70 marks)



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Syllabus

Module 1

Design Process:- Introduction to Design and Engineering Design, Defining a Design Process:-Detailing Customer Requirements, Setting Design Objectives, Identifying Constraints, Establishing Functions, Generating Design Alternatives and Choosing a Design.

Module 2

Design Thinking Approach:-Introduction to Design Thinking, Iterative Design Thinking Process Stages: Empathize, Define, Ideate, Prototype and Test. Design Thinking as Divergent-Convergent Questioning. Design Thinking in a Team Environment.

Module 3

Design Communication (Languages of Engineering Design):-Communicating Designs Graphically, Communicating Designs Orally and in Writing. Mathematical Modeling In Design, Prototyping and Proofing the Design.

Module 4

Design Engineering Concepts:-Project-based Learning and Problem-based Learning in Design.Modular Design and Life Cycle Design Approaches. Application of Biomimicry,Aesthetics and Ergonomics in Design. Value Engineering, Concurrent Engineering, and Reverse Engineering in Design.

Module 5

Expediency, Economics and Environment in Design Engineering:-Design for Production, Use, and Sustainability. Engineering Economics in Design. Design Rights. Ethics in Design

Text Books

- 1) YousefHaik, SangarappillaiSivaloganathan, Tamer M. Shahin, Engineering Design Process, Cengage Learning 2003, Third Edition, ISBN-10: 9781305253285,
- 2) Voland, G., Engineering by Design, Pearson India 2014, Second Edition, ISBN 9332535051

Reference Books

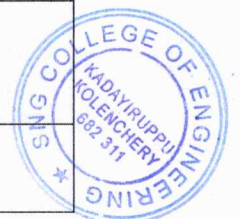
- 1.Philip Kosky, Robert Balmer, William Keat, George Wise, Exploring Engineering, Fourth Edition: An Introduction to Engineering and Design, Academic Press 2015, 4th Edition, ISBN: 9780128012420.
2. Clive L. Dym, Engineering Design: A Project-Based Introduction, John Wiley & Sons, New York 2009, Fourth Edition, ISBN: 978-1-118-32458-5
3. Nigel Cross, Design Thinking: Understanding How Designers Think and Work, Berg Publishers 2011, First Edition, ISBN: 978-1847886361
4. Pahl, G., Beitz, W., Feldhusen, J., Grote, K.-H., Engineering Design: A Systematic Approach, Springer 2007, Third Edition, ISBN 978-1-84628-319-2

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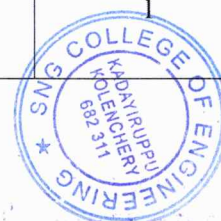


Course Contents and Lecture Schedule

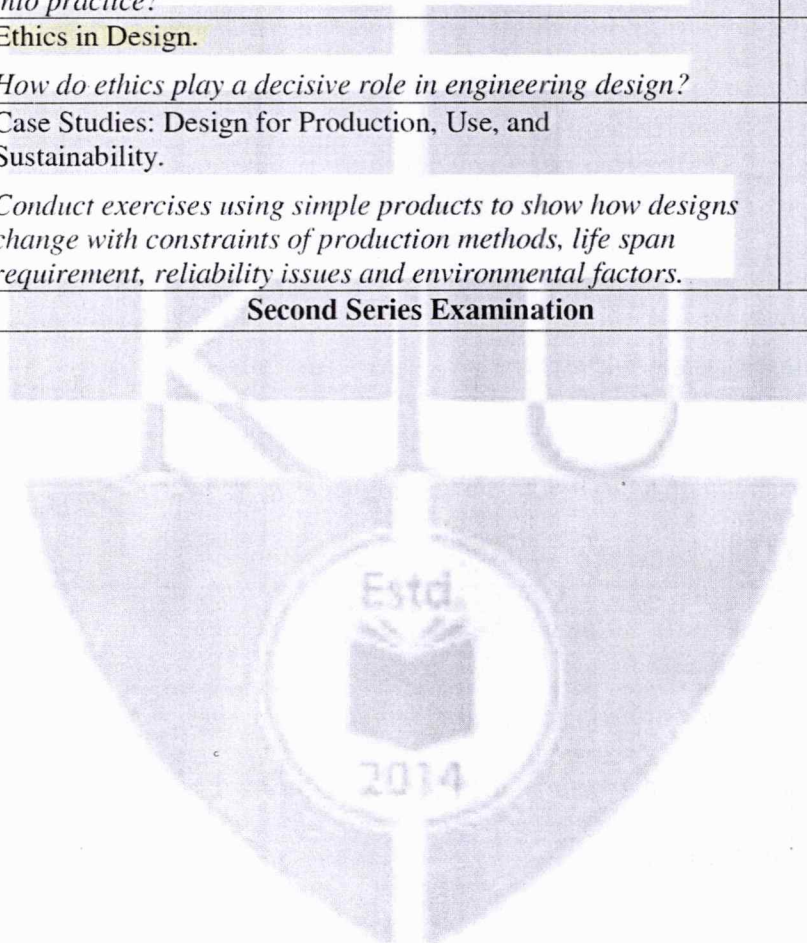
No	Topic	No. of Lectures
1	<u>Module 1: Design Process</u>	
1.1	Introduction to Design and Engineering Design. <i>What does it mean to design something? How Is engineering design different from other kinds of design? Where and when do engineers design? What are the basic vocabulary in engineering design? How to learn and do engineering design.</i>	1
1.2	<i>Defining a Design Process-: Detailing Customer Requirements.</i> <i>How to do engineering design? Illustrate the process with an example. How to identify the customer requirements of design?</i>	1
1.3	<i>Defining a Design Process-: Setting Design Objectives, Identifying Constraints, Establishing Functions.</i> <i>How to finalize the design objectives? How to identify the design constraints? How to express the functions a design in engineering terms?</i>	1
1.4	<i>Defining a Design Process-: Generating Design Alternatives and Choosing a Design.</i> <i>How to generate or create feasible design alternatives? How to identify the "best possible design"?</i>	1
1.5	Case Studies:- Stages of Design Process. <i>Conduct exercises for designing simple products going through the different stages of design process.</i>	1
2	<u>Module 2: Design Thinking Approach</u>	
2.1	Introduction to Design Thinking <i>How does the design thinking approach help engineers in creating innovative and efficient designs?</i>	1
2.2	Iterative Design Thinking Process Stages: Empathize, Define, Ideate, Prototype and Test. <i>How can the engineers arrive at better designs utilizing the iterative design thinking process (in which knowledge acquired in the later stages can be applied back to the earlier stages)?</i>	1
2.3	Design Thinking as Divergent-Convergent Questioning. <i>Describe how to create a number of possible designs and then how to refine and narrow down to the 'best design'.</i>	1
2.4	Design Thinking in a Team Environment. <i>How to perform design thinking as a team managing the conflicts ?</i>	1
2.5	Case Studies: Design Thinking Approach. <i>Conduct exercises using the design thinking approach for</i>	1



	<i>designing any simple products within a limited time and budget</i>	
3	Module 3: Design Communication (Languages of Engineering Design)	
3.1	Communicating Designs Graphically. <i>How do engineering sketches and drawings convey designs?</i>	1
3.2	Communicating Designs Orally and in Writing. <i>How can a design be communicated through oral presentation or technical reports efficiently?</i>	1
First Series Examination		
3.3	Mathematical Modelling in Design. <i>How do mathematics and physics become a part of the design process?</i>	1
3.4	Prototyping and Proofing the Design. <i>How to predict whether the design will function well or not?</i>	1
3.5	Case Studies: Communicating Designs Graphically. <i>Conduct exercises for design communication through detailed 2D or 3D drawings of simple products with design detailing, material selection, scale drawings, dimensions, tolerances, etc.</i>	1
4	Module 4: Design Engineering Concepts	
4.1	Project-based Learning and Problem-based Learning in Design. <i>How engineering students can learn design engineering through projects?</i> <i>How students can take up problems to learn design engineering?</i>	1
4.2	Modular Design and Life Cycle Design Approaches. <i>What is modular approach in design engineering? How it helps?</i> <i>How the life cycle design approach influences design decisions?</i>	1
4.3	Application of Bio-mimicry, Aesthetics and Ergonomics in Design. <i>How do aesthetics and ergonomics change engineering designs?</i> <i>How do the intelligence in nature inspire engineering designs? What are the common examples of bio-mimicry in engineering?</i>	1
4.4	Value Engineering, Concurrent Engineering, and Reverse Engineering in Design. <i>How do concepts like value engineering , concurrent engineering and reverse engineering influence engineering designs?</i>	1
4.5	Case Studies: Bio-mimicry based Designs. <i>Conduct exercises to develop new designs for simple</i>	1



	<i>products using bio-mimicry and train students to bring out new nature inspired designs.</i>	
5	<u>Module 5: Expediency, Economics and Environment in Design Engineering</u>	
5.1	Design for Production, Use, and Sustainability. <i>How designs are finalized based on the aspects of production methods, life span, reliability and environment?</i>	1
5.2	Engineering Economics in Design. <i>How to estimate the cost of a particular design and how will economics influence the engineering designs?</i>	1
5.3	Design Rights. <i>What are design rights and how can an engineer put it into practice?</i>	1
5.4	Ethics in Design. <i>How do ethics play a decisive role in engineering design?</i>	1
5.5	Case Studies: Design for Production, Use, and Sustainability. <i>Conduct exercises using simple products to show how designs change with constraints of production methods, life span requirement, reliability issues and environmental factors.</i>	1
Second Series Examination		



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1. The design process is a series of decisions that are made based on the requirements of the product and the constraints of the design process.

HUT 300	Industrial Economics & Foreign Trade	Category	L	T	P	CREDIT
		HSMC	3	0	0	3

Preamble: To equip the students to take industrial decisions and to create awareness of economic environment.

Prerequisite: Nil

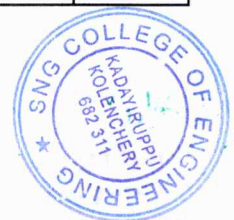
Course Outcomes: After the completion of the course the student will be able to

CO1	Explain the problem of scarcity of resources and consumer behaviour, and to evaluate the impact of government policies on the general economic welfare. (Cognitive knowledge level: Understand)
CO2	Take appropriate decisions regarding volume of output and to evaluate the social cost of production. (Cognitive knowledge level: Apply)
CO3	Determine the functional requirement of a firm under various competitive conditions. (Cognitive knowledge level: Analyse)
CO4	Examine the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society. (Cognitive knowledge level: Analyse)
CO5	Determine the impact of changes in global economic policies on the business opportunities of a firm. (Cognitive knowledge level: Analyse)

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2										3	
CO2	2	2			2	2	3				3	
CO3	2	2	1								3	
CO4	2	2	1			1					3	
CO5	2	2	1								3	


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Abstract POs defined by National Board of Accreditation			
PO#	Broad PO	PO#	Broad PO
PO1	Engineering Knowledge	PO7	Environment and Sustainability
PO2	Problem Analysis	PO8	Ethics
PO3	Design/Development of solutions	PO9	Individual and team work
PO4	Conduct investigations of complex problems	PO10	Communication
PO5	Modern tool usage	PO11	Project Management and Finance
PO6	The Engineer and Society	PO12	Lifelong learning

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		End Semester Examination Marks
	Test 1 (Marks)	Test 2 (Marks)	
Remember	15	15	30
Understand	20	20	40
Apply	15	15	30

Mark Distribution

Total Marks	CIE Marks	ESE Marks	ESE Duration
150	50	100	3 hours


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Continuous Internal Evaluation Pattern:

Attendance	: 10 marks
Continuous Assessment - Test (2 numbers)	: 25 marks
Continuous Assessment - Assignment	: 15 marks

Internal Examination Pattern:

Each of the two internal examinations has to be conducted out of 50 marks. First series test shall be preferably conducted after completing the first half of the syllabus and the second series test shall be preferably conducted after completing remaining part of the syllabus. There will be two parts: Part A and Part B. Part A contains 5 questions (preferably, 2 questions each from the completed modules and 1 question from the partly completed module), having 3 marks for each question adding up to 15 marks for part A. Students should answer all questions from Part A. Part B contains 7 questions (preferably, 3 questions each from the completed modules and 1 question from the partly completed module), each with 7 marks. Out of the 7 questions, a student should answer any 5.

End Semester Examination Pattern:

There will be two parts; Part A and Part B.

Part A : 30 marks

Part B : 70 marks

Part A contains 10 questions with 2 questions from each module, having 3 marks for each question. Students should answer all questions. Part B contains 2 questions from each module of which a student should answer any one. Each question can have maximum 3 sub-divisions and carries 14 marks.



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SYLLABUS

HUT 300 Industrial Economics & Foreign Trade

Module 1 (Basic Concepts and Demand and Supply Analysis)

Scarcity and choice - Basic economic problems- PPC – Firms and its objectives – types of firms – Utility – Law of diminishing marginal utility – Demand and its determinants – law of demand – elasticity of demand – measurement of elasticity and its applications – Supply, law of supply and determinants of supply – Equilibrium – Changes in demand and supply and its effects – Consumer surplus and producer surplus (Concepts) – Taxation and deadweight loss.

Module 2 (Production and cost)

Production function – law of variable proportion – economies of scale – internal and external economies – Isoquants, isocost line and producer's equilibrium – Expansion path – Technical progress and its implications – Cobb-Douglas production function - Cost concepts – Social cost: private cost and external cost – Explicit and implicit cost – sunk cost - Short run cost curves - long run cost curves – Revenue (concepts) – Shutdown point – Break-even point.

Module 3 (Market Structure)

Perfect and imperfect competition – monopoly, regulation of monopoly, monopolistic completion (features and equilibrium of a firm) – oligopoly – Kinked demand curve – Collusive oligopoly (meaning) – Non-price competition – Product pricing – Cost plus pricing – Target return pricing – Penetration pricing – Predatory pricing – Going rate pricing – Price skimming.

Module 4 (Macroeconomic concepts)

Circular flow of economic activities – Stock and flow – Final goods and intermediate goods - Gross Domestic Product - National Income – Three sectors of an economy- Methods of measuring national income – Inflation- causes and effects – Measures to control inflation-Monetary and fiscal policies – Business financing- Bonds and shares -Money market and Capitalmarket – Stock market – Demat account and Trading account - SENSEX and NIFTY.

Module 5 (International Trade)

Advantages and disadvantages of international trade - Absolute and Comparative advantage theory - Heckscher - Ohlin theory - Balance of payments – Components – Balance of Payments

deficit and devaluation – Trade policy – Free trade versus protection – Tariff and non-tariff barriers.

Reference Materials

1. Gregory N Mankiw, 'Principles of Micro Economics', Cengage Publications
2. Gregory N Mankiw, 'Principles of Macro Economics', Cengage Publications
3. Dwivedi D N, 'Macro Economics', Tata McGraw Hill, New Delhi.
4. Mithani D M, 'Managerial Economics', Himalaya Publishing House, Mumbai.
5. Francis Cherunilam, 'International Economics', McGraw Hill, New Delhi.

Sample Course Level Assessment Questions

Course Outcome 1 (CO1):

1. Why does the problem of choice arise?
2. What are the central problems?
3. How do we solve the basic economic problems?
4. What is the relation between price and demand?
5. Explain deadweight loss due to the imposition of a tax.

Course Outcome 2 (CO2):

1. What is shutdown point?
2. What do you mean by producer equilibrium?
3. Explain break-even point;
4. Suppose a chemical factory is functioning in a residential area. What are the external costs?

Course Outcome 3 (CO3):

1. Explain the equilibrium of a firm under monopolistic competition.
2. Why is a monopolist called price maker?
3. What are the methods of non-price competition under oligopoly?


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4. What is collusive oligopoly?

Course Outcome 4 (CO4):

1. What is the significance of national income estimation?
2. How is GDP estimated?
3. What are the measures to control inflation?
4. How does inflation affect fixed income group and wage earners?

Course Outcome 5 (CO5):

1. What is devaluation?
2. Suppose a foreign country imposes a tariff on Indian goods. How does it affect India's exports?
3. What is free trade?
4. What are the arguments in favour of protection?



Model Question paper

QP CODE:

PAGES:3

Reg No: _____

Name : _____

**APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY FIFTH /SIXTH SEMESTER
B.TECH DEGREE EXAMINATION, MONTH & YEAR**

Course Code: HUT 300

Course Name: Industrial Economics & Foreign Trade

Max.Marks:100

Duration: 3 Hours

PART A

Answer all Questions. Each question carries 3 Marks

1. Why does an economic problem arise?
2. What should be the percentage change in price of a product if the sale is to be increased by 50 percent and its price elasticity of demand is 2?
3. In the production function $Q = 2L^{1/2}K^{1/2}$ if $L=36$ how many units of capital are needed to produce 60 units of output?
4. Suppose in the short run $AVC < P < AC$. Will this firm produce or shut down? Give reason.
5. What is predatory pricing?
6. What do you mean by non- price competition under oligopoly?
7. What are the important economic activities under primary sector?
8. Distinguish between a bond and share?
9. What are the major components of balance of payments?

8


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10. What is devaluation?

(10 x 3 = 30 marks)

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) Prepare a utility schedule showing units of consumption, total utility and marginal utility, and explain the law of diminishing marginal utility. Point out any three limitations of the law.
- b) How is elasticity of demand measured according to the percentage method? How is the measurement of elasticity of demand useful for the government?

Or

12. a) Explain the concepts consumer surplus and producer surplus.
- b) Suppose the government imposes a tax on a commodity where the tax burden met by the consumers. Draw a diagram and explain dead weight loss. Mark consumer surplus, producer surplus, tax revenue and dead weight loss in the diagram.

MODULE II

13. a) What are the advantages of large-scale production?
- b) Explain Producer equilibrium with the help of isoquants and isocost line. What is expansion path?

Or

14. a) Explain break-even analysis with the help of a diagram.
- b) Suppose the monthly fixed cost of a firm is Rs. 40000 and its monthly total variable cost is Rs. 60000.
- i. If the monthly sales is Rs. 120000 estimate contribution and break-even sales.
- ii. If the firm wants to get a monthly profit of Rs.40000, what should be the sales?
- c) The total cost function of a firm is given as $TC=100+50Q - 11Q^2+Q^3$. Find marginal cost when output equals 5 units.

MODULE III



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Kadayiruppu, Kolenchery-6

15. a) What are the features of monopolistic competition?
b) Explain the equilibrium of a firm earning supernormal profit under monopolistic competition.

Or

16. a) Make comparison between perfect competition and monopoly.
b) Explain price rigidity under oligopoly with the help of a kinked demand curve.

MODULE IV

17. a) How is national income estimated under product method and expenditure method?
b) Estimate GDPmp, GNPmp and National income

Private consumption expenditure	= 2000 (in 000 cores)
Government Consumption	= 500
NFIA	= -(300)
Investment	= 800
Net=exports	=700
Depreciation	= 400
Net-indirect tax	= 300

Or

18. a) What are the monetary and fiscal policy measures to control inflation?
b) What is SENSEX?

MODULE V

19. a) What are the advantages of disadvantages of foreign trade?
b) Explain the comparative cost advantage.

Or

20. a) What are the arguments in favour protection?
b) Examine the tariff and non-tariff barriers to international trade.

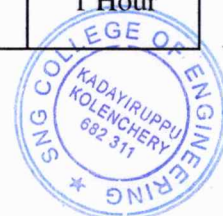
(5 × 14 = 70 marks)

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Teaching Plan

Module 1 (Basic concepts and Demand and Supply Analysis)		7 Hours
1.1	Scarcity and choice – Basic economic problems - PPC	1 Hour
1.2	Firms and its objectives – types of firms	1 Hour
1.3	Utility – Law of diminishing marginal utility – Demand – law of demand	1 Hour
1.4	Measurement of elasticity and its applications	1 Hour
1.5	Supply, law of supply and determinants of supply	1 Hour
1.6	Equilibrium – changes in demand and supply and its effects	1 Hour
1.7	Consumer surplus and producer surplus (Concepts) – Taxation and deadweight loss.	1 Hour
Module 2 (Production and cost)		7 Hours
2.1	Productions function – law of variable proportion	1 Hour
2.2	Economies of scale – internal and external economies	1 Hour
2.3	producers equilibrium – Expansion path	1 Hour
2.4	Technical progress and its implications – cob Douglas Production function	1 Hour
2.5	Cost concepts – social cost: private cost and external cost – Explicit and implicit cost – sunk cost	1 Hour
2.6	Short run cost curves & Long run cost curves	1 Hour
2.7	Revenue (concepts) – shutdown point – Break-even point.	1 Hour
Module 3 (Market Structure)		6 hours
3.1	Equilibrium of a firm, MC – MR approach and TC – TR approach	1 Hour
3.2	Perfect competition & Imperfect competition	1 Hour
3.3	Monopoly – Regulation of monopoly – Monopolistic competition	1 Hour
3.4	Oligopoly – kinked demand curve	1 Hour
3.5	Collusive oligopoly (meaning) – Non price competition	1 Hour
3.6	Cost plus pricing – Target return pricing – Penetration, Predatory pricing – Going rate pricing – price skimming	1 Hour



Module 4 (Macroeconomic concepts)		7 Hours
4.1	Circular flow of economic activities	1 Hour
4.2	Stock and flow – Final goods and intermediate goods – Gross Domestic Product - National income – Three sectors of an economy	1 Hour
4.3	Methods of measuring national income	1 Hour
4.4	Inflation – Demand pull and cost push – Causes and effects	1 Hour
4.5	Measures to control inflation – Monetary and fiscal policies	1 Hour
4.6	Business financing – Bonds and shares – Money market and capital market	1 Hour
4.7	Stock market – Demat account and Trading account – SENSEX and NIFTY	1 Hour
Module 5 (International Trade)		8 Hours
5.1	Advantages and disadvantages of international trade	1 Hour
5.2	Absolute and comparative advantage theory	2 Hour
5.3	Heckscher – Ohlin theory	1 Hour
5.4	Balance of payments - components	1 Hour
5.5	Balance of payments deficit and devaluation	1 Hour
5.6	Trade policy – Free trade versus protection	1 Hour
5.7	Tariff and non tariff barriers.	1 Hour


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HUT 310	Management for Engineers	Category	L	T	P	Credit
		HMC	3	0	0	3

Preamble: This course is intended to help the students to learn the basic concepts and functions of management and its role in the performance of an organization and to understand various decision-making approaches available for managers to achieve excellence. Learners shall have a broad view of different functional areas of management like operations, human resource, finance and marketing.

Prerequisite: Nil

Course Outcomes After the completion of the course the student will be able to

CO1	Explain the characteristics of management in the contemporary context (Cognitive Knowledge level: Understand).
CO2	Describe the functions of management (Cognitive Knowledge level: Understand).
CO3	Demonstrate ability in decision making process and productivity analysis (Cognitive Knowledge level: Understand).
CO4	Illustrate project management technique and develop a project schedule (Cognitive Knowledge level: Apply).
CO5	Summarize the functional areas of management (Cognitive Knowledge level: Understand).
CO6	Comprehend the concept of entrepreneurship and create business plans (Cognitive Knowledge level: Understand).



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Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2				1	2	2	2		2	1	1
CO2	2				1	1		2	1	2	1	1
CO3	2	2	2	2	1							
CO4	2	2	2	2	1						2	1
CO5	2					1	1		1	2	1	
CO6		2	2	2	1	1	1	1	1	1	1	1

Abstract POs defined by National Board of Accreditation				
PO1	Engineering Knowledge		PO7	Environment and Sustainability
PO2	Problem Analysis		PO8	Ethics
PO3	Design/Development of solutions		PO9	Individual and team work
PO4	Conduct investigations of complex problems		PO10	Communication
PO5	Modern tool usage		PO11	Project Management and Finance
PO6	The Engineer and Society		PO12	Life long learning

Assessment Pattern

Bloom's Category	Test 1 (Marks in percentage)	Test 2 (Marks in percentage)	End Semester Examination (Marks in percentage)
Remember	15	15	30
Understand	15	15	30
Apply	20	20	40
Analyse			
Evaluate			
Create			


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Mark Distribution

Total Marks	CIE Marks	ESE Marks	ESE Duration
150	50	100	3 Hours

Continuous Internal Evaluation Pattern:

Attendance : 10 marks

Continuous Assessment - Test : 25 marks

Continuous Assessment - Assignment : 15 marks

Internal Examination Pattern:

Each of the two internal examinations has to be conducted out of 50 marks. First series test shall be preferably conducted after completing the first half of the syllabus and the second series test shall be preferably conducted after completing remaining part of the syllabus. There will be two parts: Part A and Part B. Part A contains 5 questions (preferably, 2 questions each from the completed modules and 1 question from the partly completed module), having 3 marks for each question adding up to 15 marks for part A. Students should answer all questions from Part A. Part B contains 7 questions (preferably, 3 questions each from the completed modules and 1 question from the partly completed module), each with 7 marks. Out of the 7 questions, a student should answer any 5.

End Semester Examination Pattern:

There will be two parts; Part A and Part B. Part A contains 10 questions with 2 questions from each module, having 3 marks for each question. Students should answer all questions. Part B contains 2 questions from each module of which a student should answer any one. Each question can have maximum 2 sub-divisions and carries 14 marks.



A. A.

SYLLABUS

HUT 310 Management for Engineers (35 hrs)

Module 1 (Introduction to management Theory- 7 Hours)

Introduction to management theory, Management Defined, Characteristic of Management, Management as an art-profession, System approaches to Management, Task and Responsibilities of a professional Manager, Levels of Manager and Skill required.

Module 2 (management and organization- 5 hours)

Management Process, Planning types , Mission, Goals, Strategy, Programmes, Procedures, Organising, Principles of Organisation, Delegation, Span of Control, Organisation Structures, Directing, Leadership, Motivation, Controlling..

Module 3 (productivity and decision making- 7 hours)

Concept of productivity and its measurement; Competitiveness; Decision making process; decision making under certainty, risk and uncertainty; Decision trees; Models of decision making.

Module 4 (project management- 8 hours)

Project Management, Network construction, Arrow diagram, Redundancy. CPM and PERT Networks, Scheduling computations, PERT time estimates, Probability of completion of project, Introduction to crashing.

Module 5 (functional areas of management- 8 hours)

Introduction to functional areas of management, Operations management, Human resources management, Marketing management, Financial management, Entrepreneurship, Business plans, Corporate social responsibility, Patents and Intellectual property rights.

References:


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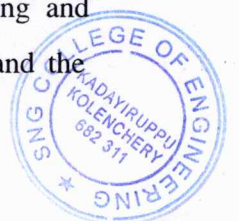
1. H. Koontz, and H. Weihrich, Essentials of Management: An International Perspective. 8th ed., McGraw-Hill, 2009.
2. P C Tripathi and P N Reddy, Principles of management, TMH, 4th edition, 2008.
3. P. Kotler, K. L. Keller, A. Koshy, and M. Jha, Marketing Management: A South Asian Perspective. 14th ed., Pearson, 2012.
4. M. Y. Khan, and P. K. Jain, Financial Management, Tata-McGraw Hill, 2008.
5. R. D. Hisrich, and M. P. Peters, Entrepreneurship: Strategy, Developing, and Managing a New Enterprise, 4th ed., McGraw-Hill Education, 1997.
6. D. J. Sumanth, Productivity Engineering and Management, McGraw-Hill Education, 1985.
7. K.Ashwathappa, 'Human Resources and Personnel Management', TMH, 3 rd edition, 2005.
8. R. B. Chase, Ravi Shankar and F. R. Jacobs, Operations and Supply Chain Management, 14th ed. McGraw Hill Education (India), 2015.

Sample Course Level Assessment Questions


Course Outcome1 (CO1): Explain the systems approach to management?

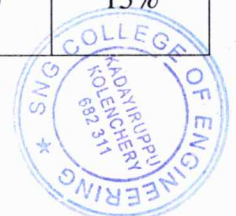
Course Outcome 2 (CO2): Explain the following terms with a suitable example Goal, Objective, and Strategy.

Course Outcome 3 (CO3): Mr. Shyam is the author of what promises to be a successful novel. He has the option to either publish the novel himself or through a publisher. The publisher is offering Mr. Shyam Rs. 20,000 for signing the contract. If the novel is successful, it will sell 200,000 copies. Else, it will sell 10,000 copies only. The publisher pays a Re. 1 royalty per copy. A market survey indicates that there is a 70% chance that the novel will be successful. If Mr. Shyam undertakes publishing, he will incur an initial cost of Rs. 90,000 for printing and marketing., but each copy sold will net him Rs. 2. Based on the given information and the



Course code	Course Name	L-T-P - Credits	Year of Introduction
EE301	POWER GENERATION, TRANSMISSION AND PROTECTION	3-1-0-4	2016
Prerequisite : Nil			
Course Objectives			
<ul style="list-style-type: none"> To set a foundation on the fundamental concepts of Power System Generation, Transmission, Distribution and Protection. 			
Syllabus			
Power Generation-conventional-hydrothermal, nuclear - non conventional solar and wind-economics of power generation-Power factor Improvement-Power transmission -line parameters -resistance- inductance and capacitance- Transmission line modelling- classifications -short line, medium line, long line-transmission line as two port network-parameters- derivation -power flow through lines-Overhead lines-types of conductors-volume of conductors- Kelvin's law- Types of Towers-calculation of Sag and tension- Insulators- types -corona-underground cables-H V DC transmission-Flexible A C transmission-power Distribution system-need for protection-circuit breakers-protective relay types -Types of protection causes of over voltages -insulation coordination			
Expected outcome .			
The students will be able to			
<ol style="list-style-type: none"> Know the basic aspects in the area of power generation, transmission, distribution and protection. Design power factor correction equipment, transmission line parameters, and decide upon the various protection schemes to be adopted in various cases. 			
Text Books:			
<ol style="list-style-type: none"> B.R. Gupta: "Power system Analysis and Design", Wheeler publishers J.B. Gupta, "A course in Electrical Power", Kataria and sons, 2004. Wadhwa, "Electrical Power system", Wiley Eastern Ltd. 2005 			
References:			
<ol style="list-style-type: none"> A.Chakrabarti, ML.Soni, P.V.Gupta, V.S.Bhatnagar, "A text book of Power system Engineering" Dhanpat Rai, 2000 Grainer J.J, Stevenson W.D, "Power system Analysis", McGraw Hill I.J.Nagarath & D.P. Kothari, "Power System Engineering", TMH Publication, K.R Padiyar, "FACTS Controllers for Transmission and Distribution" New Age International, New Delhi Stevenson Jr. Elements of Power System Analysis, TMH Sunil S Rao, "Switch gear and Protection", Khanna Publishers 			
Course Plan			
Module	Contents	Hours	Sem. Exam Marks
I	Introduction: Typical layout of Power system Network Generation of Electric Power: Overview of conventional (Hydro, Thermal and Nuclear) and Nonconventional Sources (Solar and Wind) (Block Diagram and Brief Description Only) Economics of Generation: Load factor, diversity factor, Load curve (Brief description only) Numerical Problems. Methods of power factor improvement using capacitors	9	15%
II	Power Transmission Transmission Line Parameters: Resistance, inductance and capacitance of 1- Φ , 2 wire lines-composite conductors	10	15%


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	<p>(Derivation Required). Inductance and capacitance of 3-Φ lines. Symmetrical and unsymmetrical spacing-transposition-double circuit lines-bundled conductors (Derivation Required) .Numerical Problems</p> <p>Modelling of Transmission Lines: Classification of lines-short lines-voltage regulation and efficiency-medium lines-nominal T and Π configurations-ABCD constants- long lines- rigorous solution- interpretation of long line equation-Ferranti effect. Tuned power lines-power flow through lines-Basics only</p>		
FIRST INTERNAL EXAMINATION			
III	<p>Introduction of Overhead transmission and underground transmission Conductors -types of conductors -copper, Aluminium and ACSR conductors -Volume of conductor required for various systems of transmission-Choice of transmission voltage, conductor size -Kelvin's law. Mechanical Characteristics of transmission lines – configuration-Types of Towers. Calculation of sag and tension-supports at equal and unequal heights -effect of wind and ice-sag template</p> <p>Insulators -Different types -Voltage distribution, grading and string efficiency of suspension insulators. Corona -disruptive critical voltage -visual critical voltage -power loss due to corona -Factors affecting corona - interference on communication lines.</p> <p>Underground Cables -types of cables -insulation resistance - voltage stress -grading of cables -capacitance of single core and 3 -core cables -current rating.</p>	9	15%
IV	<p>HVDC Transmission: Comparison between AC & DC Transmission ,Power flow equations and control, Types of DC links</p> <p>Flexible AC Transmission systems: Need and Benefits, SCV, Configuration of FC + TCR, Series compensation, Configuration of TCSC</p> <p>Power distribution systems –Radial and Ring Main Systems - DC and AC distribution: Types of distributors- bus bar arrangement -Concentrated and Uniform loading -Methods of solving distribution problems.</p>	8	15%
SECOND INTERNAL EXAMINATION			
V	<p>Need for power system protection. Circuit breakers – principle of operation- formation of arc-Arc quenching theory- Restriking Voltage-Recovery voltage, RRRV (Derivation Required). Interruption of Capacitive currents and current chopping (Brief Description Only). Types of Circuit Breakers: Air blast CB – Oil CB – SF6 CB – Vacuum CB – CB ratings.</p>		20%



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	Protective Relays- Zones of Protection, Essential Qualities- Classification of Relays -Electro mechanical, Static Relays, Microprocessor Based Relay. Electromechanical Relays-Attracted Armature, Balanced Beam, Induction disc, Thermal Relays (Brief Description only) Static Relays-Merits and Demerits, Basic components, Comparison and duality of Amplitude and Phase comparators. Static overcurrent, Differential, Distance Relays, Directional Relay-(principle and Block diagram only) Microprocessor Based Relay-Block diagram and flow chart of Over current Relay, Numerical Relay(Basics Only)	12	
VI	Protection of alternator: Stator inter turn, Earth fault Protection and Differential protection Protection of transformers- Percentage Differential Protection-Buchholz Relay Protection of transmission lines- Differential Protection- carrier current protection Causes of over voltages – surges and traveling waves – voltage waves on loss less transmission lines, Bewley Lattice diagram. Protection against over voltages - Surge diverters - Insulation co-ordination	8	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN:

Maximum Marks: 100

Exam Duration: 3Hours.

Part A: 8 compulsory questions.

One question from each module of Module I - IV; and two each from Module V & VI.


Student has to answer all questions. (8 x5)=40


Part B: 3 questions uniformly covering Modules I & II. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part C: 3 questions uniformly covering Modules III & IV. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part D: 3 questions uniformly covering Modules V & VI. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

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Course code	Course Name	L-T-P - Credits	Year of Introduction
EE306	POWER SYSTEM ANALYSIS	3-0-0-3	2016

Prerequisite: Nil

Course Objectives

- To enable the students to analyse power systems under normal and abnormal conditions.
- To understand the need for load flow analysis and different methods
- To understand power system modeling
- To understand the need for stability studies and their analysis

Syllabus

Per unit quantities - modeling of power system components - methods of analyzing faults in symmetrical and unsymmetrical case - load flow studies - Automatic Generation Control - Automatic voltage control – Economic load dispatch - Unit commitment - Power system stability - Solution of swing equation - Methods of improving stability limits

Expected outcome .

The students will be able to:

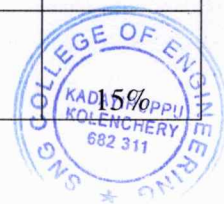
- Analyse power systems under normal and abnormal conditions.
- Carry out load flow studies under normal and abnormal conditions

References:

1. Cotton H. and H. Barber, *Transmission & Distribution of Electrical Energy*, 3/e, Hodder and Stoughton, 1978.
2. Gupta B. R., *Power System Analysis and Design*, S. Chand, New Delhi, 2006.
3. Gupta J.B., *Transmission & Distribution of Electrical Power*, S.K. Kataria & Sons, 2009.
4. Hadi Saadat, *Power System Analysis*, 2/e, McGraw Hill, 2002.
5. Kothari D. P. and I. J. Nagrath, *Modern Power System Analysis*, 2/e, TMH, 2009.
6. Kundur P., *Power system Stability and Control*, McGraw Hill, 199
7. Soni, M.L., P. V. Gupta and U. S. Bhatnagar, *A Course in Electrical Power*, Dhanpat Rai & Sons, New Delhi, 1984.
8. Stevenson W. D., *Elements of Power System Analysis*, 4/e, McGraw Hill, 1982.
9. Uppal S. L. and S. Rao, *Electrical Power Systems*, Khanna Publishers, 2009.
10. Wadhwa C. L., *Electrical Power Systems*, 33/e, New Age International, 2004.
11. Weedy B. M., B. J. Cory, N. Jenkins, J. B. Ekanayake and G. Strbac, *Electric Power System*, John Wiley & Sons, 2012.

Course Plan

Module	Contents	Hours	Sem. Exam Marks
I	Per unit quantities-single phase and three phase-selection of base quantities -advantages of per unit system –changing the base of per unit quantities-Simple problems.	2	15%
	Modelling of power system components - single line diagram – per unit quantities. Symmetrical components- sequence impedances and sequence networks of generators, transformers and transmission lines.	3	
II	Methods of analyzing faults in symmetrical and unsymmetrical case- effects of faults - Power system faults - symmetrical faults - short circuit MVA - current limiting reactors-	8	



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	Unsymmetrical faults - single line to ground, line to line, double line to ground faults -consideration of prefault current-problems.		
FIRST INTERNAL EXAMINATION			
III	Load flow studies – Introduction-types-network model formulation - formation of bus impedance and admittance matrix, Gauss-Siedel (two iterations), Newton-Raphson (Qualitative analysis only) and Fast Decoupled method (two iterations) - principle of DC load flow.	8	15%
IV	Automatic Generation Control: Load frequency control: single area and two area systems - Automatic voltage control.	6	15%
SECOND INTERNAL EXAMINATION			
V	Economic Operation - Distribution of load between units within a plant - transmission loss as a function of plant generation - distribution of load between plants - Method of computing penalty factors and loss coefficients.	5	20%
	Unit commitment: Introduction — Constraints on unit commitments: Spinning reserve, Thermal unit constraints- Hydro constraints. -	2	
VI	Power system stability - steady state, dynamic and transient stability-power angle curve-steady state stability limit	3	20%
	Mechanics of angular motion-Swing equation – Solution of swing equation - Point by Point method - RK method - Equal area criterion application - Methods of improving stability limits.	5	
END SEMESTER EXAM			

QUESTION PAPER PATTERN:

Maximum Marks: 100

Exam Duration: 3Hours.

Part A: 8 compulsory questions.

One question from each module of Modules I - IV; and two each from Module V & VI.

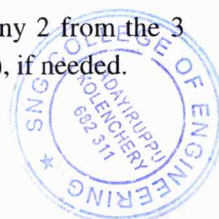
Student has to answer all questions. (8 x5)=40

Part B: 3 questions uniformly covering Modules I & II. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part C: 3 questions uniformly covering Modules III & IV. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part D: 3 questions uniformly covering Modules V & VI. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.


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Course code	Course Name	L-T-P - Credits	Year of Introduction
HS300	Principles of Management	3-0-0-3	2016
Prerequisite : Nil			
Course Objectives			
<ul style="list-style-type: none"> To develop ability to critically analyse and evaluate a variety of management practices in the contemporary context; To understand and apply a variety of management and organisational theories in practice; To be able to mirror existing practices or to generate their own innovative management competencies, required for today's complex and global workplace; To be able to critically reflect on ethical theories and social responsibility ideologies to create sustainable organisations. 			
Syllabus			
Definition, roles and functions of a manager, management and its science and art perspectives, management challenges and the concepts like, competitive advantage, entrepreneurship and innovation. Early contributors and their contributions to the field of management. Corporate Social Responsibility. Planning, Organizing, Staffing and HRD functions, Leading and Controlling. Decision making under certainty, uncertainty and risk, creative process and innovation involved in decision making.			
Expected outcome.			
A student who has undergone this course would be able to			
<ol style="list-style-type: none"> manage people and organisations critically analyse and evaluate management theories and practices plan and make decisions for organisations do staffing and related HRD functions 			
Text Book:			
Harold Koontz and Heinz Weirich, <i>Essentials of Management</i> , McGraw Hill Companies, 10th Edition.			
References:			
<ol style="list-style-type: none"> Daft, <i>New era Management</i>, 11th Edition, Cengage Learning Griffin, <i>Management Principles and Applications</i>, 10th Edition, Cengage Learning Heinz Weirich, Mark V Cannice and Harold Koontz, <i>Management: a Global, Innovative and Entrepreneurial Perspective</i>, McGraw Hill Education, 14th Edition Peter F Drucker, <i>The Practice of Management</i>, McGraw Hill, New York Robbins and Coulter, <i>Management</i>, 13th Edition, 2016, Pearson Education 			
Course Plan			
Module	Contents	Hours	Sem. Exam Marks
I	Introduction to Management: definitions, managerial roles and functions; Science or Art perspectives- External environment-global, innovative and entrepreneurial perspectives of Management (3 Hrs.)- Managing people and organizations in the context of New Era- Managing for competitive advantage - the Challenges of Management (3 Hrs.)	6	15%

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II	Early Contributions and Ethics in Management: Scientific Management- contributions of Taylor, Gilbreths, Human Relations approach-contributions of Mayo, McGregor's Theory, Ouchi's Theory Z (3 Hrs.) Systems Approach, the Contingency Approach, the Mckinsey 7-S Framework Corporate Social responsibility- Managerial Ethics. (3 Hrs)	6	15%
FIRST INTERNAL EXAMINATION			
III	Planning: Nature and importance of planning, -types of plans (3 Hrs.)- Steps in planning, Levels of planning - The Planning Process. – MBO (3 Hrs.).	6	15%
IV	Organising for decision making: Nature of organizing, organization levels and span of control in management Organisational design and structure –departmentation, line and staff concepts (3 Hrs.) Limitations of decision making- Evaluation and selecting from alternatives- programmed and non programmed decisions - decision under certainty, uncertainty and risk-creative process and innovation (3 Hrs.)	6	15%
SECOND INTERNAL EXAMINATION			
V	Staffing and related HRD Functions: definition, Empowerment, staff – delegation, decentralization and recentralisation of authority – Effective Organizing and culture-responsive organizations –Global and entrepreneurial organizing (3 Hrs.) Manager inventory chart-matching person with the job-system approach to selection (3 Hrs.) Job design-skills and personal characteristics needed in managers-selection process, techniques and instruments (3 Hrs.)	9	20%
VI	Leading and Controlling: Leading Vs Managing – Trait approach and Contingency approaches to leadership - Dimensions of Leadership (3 Hrs.) - Leadership Behavior and styles – Transactional and Transformational Leadership (3 Hrs.) Basic control process- control as a feedback system – Feed Forward Control – Requirements for effective control – control techniques – Overall controls and preventive controls – Global controlling (3 Hrs.)	9	20%
END SEMESTER EXAM			

Question Paper Pattern

Max. marks: 100, Time: 3 hours .

The question paper shall consist of three parts

Part A: 4 questions uniformly covering modules I and II. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part B : 4 questions uniformly covering modules III and IV. Each question carries 10 marks
Students will have to answer any three questions out of 4 (3X10 marks =30 marks)

Part C: 6 questions uniformly covering modules V and VI. Each question carries 10 marks
Students will have to answer any four questions out of 6 (4X10 marks =40 marks)

Note: In all parts, each question can have a maximum of four sub questions, if needed.

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Course code	Course Name	L-T-P -Credits	Year of Introduction
EE366	Illumination Engineering	3-0-0-3	2016

Prerequisite: Nil

Course Objectives

- To provide an introduction to the fundamentals of illumination engineering and architectural lighting design.
- To impart lighting fundamentals, measurement, and technology and their application in the analysis and design of architectural lighting systems

Syllabus

Introduction of Light , Types of illumination , Lighting systems , Lighting Scheme , Measurement of Light , Laws of illumination , Design of Interior Lighting, Determination of Lamp Lumen output taking into account voltage and temperature variations , Indian standard recommendation and standard practices for illumination levels in various areas, Special feature for entrance, staircase, Corridor lighting and industrial building , Design of Outdoor Lighting , Special Features of Aesthetic Lighting

Expected outcome.

The students will be able to:

- Identify the criteria for the selection of lamps and lighting systems for an indoor or outdoor space
- Perform calculations on photometric performance of light sources and luminaires for lighting design
- Evaluate different types of lighting designs and applications

Text Books

1. D.C. Pritchard Lighting, Routledge, 2016
2. Jack L. Lindsey, Applied Illumination Engineering , PHI, 1991
3. John Matthews Introduction to the Design and Analysis of Building Electrical Systems, Springer, 1993
4. M.A. Cayless, Lamps and Lighting , Routledge, 1996

References:

1. IS CODE 3646
2. IS CODE 6665

Course Plan

Module	Contents	Hours	Sem. Exam Marks
I	Introduction of Light : Types of illumination, Day lighting, Supplementary artificial lighting and total lighting, Quality of good lighting, Factors affecting the lighting-shadow, glare, reflection, Colour rendering and stroboscopic effect, Methods of artificial lighting, Lighting systems-direct, indirect, semi direct, semi indirect, Lighting scheme, General and localised	6	15%
II	Measurement of Light : Definition of luminous flux, Luminous intensity, Lumen, Candle power, Illumination, M.H.C.P, M.S.C.P, M.H.S.C.P, Lamp efficiency, Brightness or luminance, Laws of illumination, Inverse square law and Lambert's Cosine law, Illumination at horizontal and vertical plane from point source, Concept of polar curve, Calculation of luminance and illumination in case of linear source, round source and flat source	7	15%

FIRST INTERNAL EXAMINATION



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III	Design of Interior Lighting : Definitions of maintenance factor, Uniformity ratio, Direct ratio, Coefficients of utilisation and factors affecting it, Illumination required for various work planes, Space to mounting height ratio, Types of fixtures and relative terms used for interior illumination such as DLOR and ULOR, Selection of lamp and luminance, Selection of utilisation factor, reflection factor and maintenance factor Determination of Lamp Lumen output taking into account voltage and temperature variations, Calculation of wattage of each lamp and no of lamps needed, Layout of lamp luminaire, Calculation of space to mounting height ratio, Indian standard recommendation and standard practices for illumination levels in various areas, Special feature for entrance, staircase, Corridor lighting and industrial building	8	15%
IV	Design of Outdoor Lighting : Street Lighting : Types of street and their level of illumination required, Terms related to street and street lighting, Types of fixtures used and their suitable application, Various arrangements in street lighting, Requirements of good street lighting, Selection of lamp and luminaire, Calculation of their wattage, Number and arrangement, Calculation of space to mounting height ratio, Calculation of illumination level available on road	7	15%
SECOND INTERNAL EXAMINATION			
V	Design of Outdoor Lighting : Flood Lighting : Terms related to flood lighting, Types of fixtures and their suitable applications, Selection of lamp and projector, Calculation of their wattage and number and their arrangement, Calculation of space to mounting height ratio, Recommended method for aiming of lamp	7	20%
VI	Special Features of Aesthetic Lighting : Monument and statue lighting, Sports lighting, Hospital lighting, Auditorium lighting	7	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN:

Maximum Marks: 100

Exam Duration: 3Hours.

Part A: 8 compulsory questions.

One question from each module of Modules I - IV; and two each from Module V & VI.

Student has to answer all questions. (8 x5)=40

Part B: 3 questions uniformly covering Modules I & II. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part C: 3 questions uniformly covering Modules III & IV. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.


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Part D: 3 questions uniformly covering Modules V & VI. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.



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COURSE CODE	COURSE NAME	L-T-P-CREDITS	YEAR OF INTRODUCTION
EE403	DISTRIBUTED GENERATION AND SMART GRIDS	3-0-0-3	2016

Prerequisite: Nil

Course objective.

- To develop a conceptual introduction to various distributed generation systems, micro grids, smart grids and their control

Syllabus:

Introduction to distributed generation and smart grids - Distributed Energy Resources – Micro Grids and their control – Protection issues for Microgrids - Smart Grids: Components – NIST Reference architecture – Smart meters - Wide Area Measurement System (WAMS), Phase Measurement Unit (PMU) - demand response- Demand Side Management - Smart Substations, HAN, NAN, SANET, Cloud computing in smart grid – Power Quality issues with smart grid

Expected Outcome:

The students will be able to:

- Explain various distributed generation systems
- Understand the microgrids and their control schemes
- Understand various developments happening in the field of Smart Grids.

TEXT BOOKS/REFERENCES:

- Ali Keyhani, Design of Smart Power Grid Renewable Energy Systems, ISBN: 978-0-470-62761-7, Wiley
- James Momoh, Smart Grid: Fundamentals of Design and Analysis, ISBN: 978-0-470-88939-8, Wiley
- R. C. Durgan, M. F. Me Granaghan, H. W. Beaty, “Electrical Power System Quality”, McGraw-Hill
- Remus Teodorescu, Marco Liserre, Pedro Rodriguez, Grid Converters for Photovoltaic and Wind Power Systems, ISBN: 978-0-470-05751-3, Wiley
- S. Chowdhury, S.P. Chowdhury and P. Crossley, Microgrids and Active Distribution Networks, ISBN 978-1-84919-014-5, IET, 2009

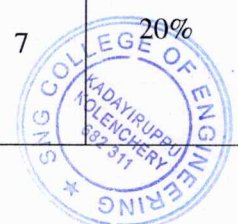
COURSE PLAN


Module	Contents	Hours	End. Sem. Exam. Marks
I	Distributed generation – Introduction - Integration of distributed generation to Grid – Concepts of Micro Grid - Typical Microgrid configurations - AC and DC micro grids - Interconnection of Microgrids - Technical and economical advantages of Microgrid -	7	15%


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	Challenges and disadvantages of Microgrid development Smart Grid: Evolution of Electric Grid - Definitions and Need for Smart Grid, Opportunities, challenges and benefits of Smart Grids		
II	Distributed energy resources: Introduction - Combined heat and power (CHP) systems - Solar photovoltaic (PV) systems – Wind energy conversion systems (WECS) - Small-scale hydroelectric power generation - Storage devices: Batteries: Lead acid, nickel metal hydrate, and lithium ion batteries , ultra-capacitors, flywheels Control of Microgrids: Introduction to Central Controller (CC) and Microsource Controllers (MCs) - Control functions for microsource controller, Active and reactive power control, Voltage control, Storage requirement for fast load tracking, Load sharing through power-frequency control	6	15%
III	Protection issues for Microgrids: Introduction, Islanding, Different islanding scenarios, Major protection issues of stand-alone Microgrid - Impact of DG integration on electricity market, environment, distribution system, communication standards and protocols. Smart Grid: Components – NIST Smart Grid Reference Architecture Introduction to Smart Meters, Electricity tariff – one part tariff, two tariff and maximum demand tariff - Dynamic pricing: time-of-use (TOU) pricing, critical-peak pricing (CPP) and Real Time Pricing- Automatic Meter Reading(AMR), Plug in Hybrid Electric Vehicles(PHEV), Vehicle to Grid, Smart Sensors, Home & Building Automation. Intelligent Electronic Devices (IED) and their application for monitoring & protection, Wide Area Measurement System (WAMS), Phase Measurement Unit (PMU).	7	15%
IV	Smart energy efficient end use devices-Smart distributed energy resources- Load Curves-Load Shaping Objectives-Methodologies - Peak load shaving - Energy management-Role of technology in demand response- Demand Side Management – Numerical Problems	7	15%
V	Advanced Metering Infrastructure (AMI), Home Area Network (HAN), Neighborhood-Area Networks (NANs), Sensor and Actuator Networks (SANETs) Smart Substations, Substation Automation, IEC 61850 Substation Architecture, Feeder Automation.	7	20%




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VI	<p>Cloud computing in smart grid: Private, public and Hybrid cloud. Cloud architecture of smart grid. Power quality: Introduction - Types of power quality disturbances - Voltage sag (or dip), transients, short duration voltage variation, Long duration voltage variation, voltage imbalance, waveform distortion, and voltage flicker - Harmonic sources: SMPS, Three phase power converters, arcing devices, saturable devices, fluorescent lamps, harmonic indices (THD, TIF, DIN, C – message weights) Power quality aspects with smart grids.</p>	8	20%
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QUESTION PAPER PATTERN:

Maximum Marks: 100

Exam Duration: 3Hours.

Part A: 8 compulsory questions.

One question from each module of Modules I - IV; and two each from Module V & VI.

Student has to answer all questions. (8 x 5)=40

Part B: 3 questions uniformly covering Modules I & II. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part C: 3 questions uniformly covering Modules III & IV. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part D: 3 questions uniformly covering Modules V & VI. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

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Course code	Course Name	L-T-P - Credits	Year of Introduction
EE404	INDUSTRIAL INSTRUMENTATION AND AUTOMATION	3-0-0-3	2016

Prerequisite: Nil

Course Objectives

- To impart knowledge about Industrial instrumentation and automation

Syllabus:

Dynamic characteristic of instrumentation- Transducers: Characteristics, Applications – Nano instrumentation - signal conditioning, MEMS, Virtual instrumentation-Automation system - actuators – sequence control, PLC

Expected Outcome:

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

- Select instruments and transducers for various physical variables.
- Get an insight on data acquisition, processing and monitoring system
- Design various signal conditioning systems for transducers.
- Analyze dynamic responses of various systems.
- Get the concepts of virtual instrumentation
- Understand the programming realization of PLC

Text books:

- Curtis D Johnson ,” *Process Control Instrumentation Technology*”, PHI, 1986
- Doebelin E.O, ‘*Measurement Systems: Application and Design*, Fourth Edition, McGraw Hill, Newyork, 1992
- DVS. Murty, ‘*Transducers and Instrumentation*’ Second Edition, PHI Learning Pvt Ltd New Delhi ,2013
- Madhuchhanda Mitra, Samarjit Sengupta, ‘*Programmable Logic Controllers and Industrial Automation An Introduction*’, Penram International Publishing (India) Pvt Ltd., 2009
- Mickell. P. Groover ‘*Automation, Production and computer integrated manufacturing*’ Prentice Hall of India, 1992
- Patranabis, D., ‘*Principles of Industrial Instrumentation*’, Second Edition Tata McGraw Hill Publishing Co. Ltd.. New Delhi
- Robert B. Northrop, ‘*Introduction to instrumentation and measurements*’, CRC, Taylor and Francis 2005

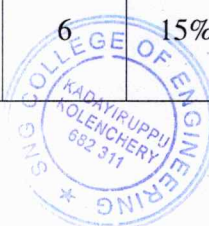
References:

- G.K.McMillan, ‘*Process/Industrial Instrument and control and hand book*’ McGraw Hill, New York,1999
- Michael P .Lucas, ‘*Distributed Control system*’, Van Nastrant Reinhold Company, New York

Course Plan

Module	Contents	Hours	Sem. Exam Marks
I	Introduction to Process Control - block diagram of process control loop, definition of elements. Sensor time response - first and second order responses. Review of Transducers: Characteristics and Choice of transducer-	6	15%

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	factors influencing choice of transducer		
II	Applications of Transducers Displace measurement: Resistance potentiometer, Capacitive and Inductive. Capacitive differential pressure measurement Torsional, shearing stress and rotating shaft Torque measurement using strain gauge. Flow measurement :Hotwire anemometer, constant resistance Constant current type Eddy current sensors, Variable reluctance tachometers Phase measurement :Analog and digital phase detectors Nano Instrumentation	8	15%
FIRST INTERNAL EXAMINATION			
III	Signal conditioning circuits-Instrumentation amplifiers- Unbalanced bridge. Bridge linearization using op amp Precision rectifiers, Log amplifiers, Charge amplifiers, Isolation amplifier, Switched capacitor circuits, Phase sensitive detectors, Noise problem in instrumentation and its minimisation	7	15%
IV	Micro Electromechanical system (MEMS) Advantages and Applications, MEMS micro sensors and actuators, Manufacturing process: Bulk micro machining and surface micromachining, MEMS accelerometers Virtual instrumentation system: architecture of virtual instruments – Virtual instruments and traditional instruments – concepts of graphical programming	7	15%
SECOND INTERNAL EXAMINATION			
V	Overview of Automation System - Architecture of Industrial Automation Systems, Different devices used in Automation Actuators, definition, types, selection. Pneumatic, Hydraulic, Electrical, Electro-Pneumatic and valves , shape memory alloys	7	20%
VI	Introduction to Sequence Control, PLCs - Working, Specifications of PLC Onboard/Inline/Remote IO's, Comparison of PLC & PC, Relay Ladder Logic- PLC Programming- realization of AND, OR logic, concept of latching, Introduction to Timer/Counters, Exercises based on Timers, Counters. Basic concepts of SCADA, DCS and CNC	7	20%
END SEMESTER EXAM			


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QUESTION PAPER PATTERN:

Maximum Marks: 100

Exam Duration: 3Hours.

Part A: 8 compulsory questions.

One question from each module of Modules I - IV; and two each from Module V & VI.

Student has to answer all questions. (8 x 5)=40

Part B: 3 questions uniformly covering Modules I & II. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part C: 3 questions uniformly covering Modules III & IV. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part D: 3 questions uniformly covering Modules V & VI. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.



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Course code	Course Name	L-T-P - Credits	Year of Introduction
EE405	Electrical System Design	3-1-0-4	2016

Prerequisite : Nil

Course Objectives

- To gain the knowledge of acts and rules used for regulating the electrical supply in our country.
- To impart sound knowledge in the design and estimation of low voltage and medium voltage electrical installations.
- To gain the knowledge of selection of distribution transformers and their installations.
- To gain the knowledge of Earthing designs in different installations and the standard dimensions of earthing systems.

Syllabus

Electrical system design practices – general awareness of IS Codes, Electricity Acts & Rules, NEC etc. Domestic Installations, Motor Installations, 11 kV substation installations. Cinema theatre, auditorium and high rise building installations. Standby generator selection and their Installations. Underground cable installations and their accessories. Types of earthing, lightning arresters, fire fitting and lifts.

Expected outcome

The students will

- Know the basic Rules and regulations in electrical installations.
- To prepare the schematic diagram, installation plan, quantity of materials and estimate for different electrical installations.

Text Book:

1. J. B. Gupta, A Course in Electrical Installation Estimating and Costing, S.K. Kataria & Sons; Reprint 2013 edition (2013).
2. K. B. Raina, S. K. Bhattacharya, Electrical Design Estimating Costing, NEW AGE; Reprint edition (2010).
3. M.K.Giridharan, Electrical Systems Design, , M/s I K International Publishers, New Delhi, 2nd edition, 2016

Data Book (Approved for use in the examination):

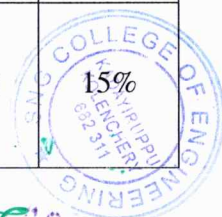
M K Giridharan, Electrical Systems Design Data Hand book, , M/s I K International Publishers , New Delhi, 2011

References:

1. National Electric Code, Bureau of Indian Standards publications, 1986.
2. Relevant Indian Standard – specifications (IS – 732, IS – 746, IS – 3043, IS – 900), etc.
3. S.L.Uppal, Electrical Wiring Estimating & Costing, Khanna Publishers (2008)

Course Plan

Module	Contents	Hours	Sem. Exam Marks
I	General awareness of IS Codes (IS 3043, IS 732, IS 2675, IS 5216-P1-2, IS 2309), The Indian Electricity Act 1910, The Indian Electricity supply Act 1948, Indian Electricity Rules 1956, The Electricity Regulatory Commission Act 1998, Electricity Act 2003, Bureau of Energy Efficiency (BEE) and its labeling. National Electric Code (NEC) - scope and safety aspects applicable to low and medium (domestic) voltage installations, Electric services in buildings, Classification of voltages, standards and specifications.	8	15%
II	Safety aspects applicable to low and medium voltage installations. General aspects of the design of electrical installations for domestic dwellings (low and medium voltage installations)–connected load calculation, sub circuit determination, selection of main distribution board, sub distribution board, MCB, ELCB, MCCB and cables for sub	10	15%



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	circuits. Pre-commissioning tests of domestic installations.		
FIRST INTERNAL EXAMINATION			
III	Medium and HV installations – selection of cables and cable glands, guidelines for cable installation in detail. Panel boards: LT & HT control panel boards. Installation of induction motors: Design of distribution systems with light power and motor loads. Design of automatic power factor correction (APFC) Panel. Selection and installation of transformers, switchgears and protective devices – Design of indoor and outdoor 11 kV substation upto 630 kVA.	10	15%
IV	Air-conditioning loads and its specifications. Energy conservation techniques. Selection of standby generator – installation and its protection. Introduction to Automatic Main Failure (AMF) System. Pre-commissioning tests of cables, transformers and generators.	8	15%
SECOND INTERNAL EXAMINATION			
V	Design of earthing system for an HT consumer, Dimensions and drawings of typical earth electrodes (1) Pipe Earthing, (2) Plate Earthing. Touch, Step and Transfer potentials at EHT Sub-Stations, Earth-mat, installations of special equipment like X-Ray, Neon-Sign, Basics of lightning arresters.	8	20%
VI	Design of illumination systems – Yard lighting, street lighting and flood lighting. Kerala Cinema Regulation Act – 1958, design and layout of installation for recreational or assembly buildings, cinema theatre and high rise building. Design of Electrical system related to firefighting, lifts and escalators.	10	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN:

Maximum Marks: 100

Exam Duration: 3Hours.

Part A: 8 compulsory questions.

One question from each module of Modules I - IV; and two each from Module V & VI.

Student has to answer all questions. (8 x5)=40

Part B: 3 questions uniformly covering Modules I & II. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part C: 3 questions uniformly covering Modules III & IV. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part D: 3 questions uniformly covering Modules V & VI. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

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Course code	Course Name	L-T-P - Credits	Year of Introduction
EE463	Computer Aided Power Systems Analysis	3-0-0-3	2016

Prerequisite: EE306 Power system analysis

Course Objectives

- To introduce computer applications in the analysis of power systems
- To understand the solution methods and techniques used in power system studies

Syllabus:

Development of network matrices from Graph theory-Formulation of Bus Impedance matrices-Load Flow Analysis-Optimal Power Flow-Network fault calculations-Contingency analysis in Power systems.

Expected outcome:

- The students will gain the ability to critically analyse the solution methods used in power system studies.

Text Books:

1. Arthur R. Bergen, Vijay Vittal, Power Systems Analysis (English) 2nd Edition, Pearson Higher Education
2. G.L.Kusic, Computer Aided Power System Analysis, PHI, 1989
3. John J. Grainger, William D. Stevenson, Jr., Power System Analysis, Tata McGraw-Hill Series in Electrical and Computer Engineering.
4. M. A. Pai, Computer Techniques in Power Systems Analysis, Tata McGraw-Hill, Second edition 2005

References:

1. I.J.Nagrath and D.P.Kothari, "Modern Power System Analysis", Tata McGraw Hill, 1980
2. J. Arriliga and N.R. Watson, Computer modelling of Electrical power systems, 2/e, John Wiley, 2001
3. LP. Singh, "Advanced Power System Analysis and Dynamics", 3/e, New Age Intl, 1996.
4. Stagg and El Abiad, "Computer methods in Power system Analysis", McGraw Hill, 1968.

Course Plan

Module	Contents	Hours	Sem. Exam Marks
I	Overview of Graph theory -tree, co-tree and incidence matrix, Development of network matrices from Graph theoretic approach. Review of solution of Linear System of equations by Gauss Jordan method, Gauss elimination, LDU factorization.	7	15%
II	Bus Reference Frame: Injections and Loads. Zbus and Y bus. Formulation of Bus Impedance matrix for elements without Mutual Coupling.	7	15%
FIRST INTERNAL EXAMINATION			
III	Inversion of YBUS for large systems using LDU factors, Tinney's Optimal ordering. Review of Gauss-Seidel Iteration using YBUS, Newton-Raphson method, Fast Decoupled Load Flow (FDLF) DC load flow, Three-phase Load Flow.	6	15%
IV	Adjustment of network operating conditions, Optimal power flow: concepts, active/reactive power objectives (Economic dispatch, MW and MVAR loss minimization) – applications- security constrained optimal power flow.	8	15%

SECOND INTERNAL EXAMINATION


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V	Network fault calculations using ZBUS and YBUS Table of Factors, Algorithm for calculating system conditions after fault – three phase short circuit, three phase to ground, double line to ground, line to line and single line to ground fault.	7	20%
VI	Contingency analysis in Power systems : Contingency Calculations using ZBUS and YBUS Table of Factors. State estimation – least square and weighted least square estimation methods for linear systems.	7	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN:

Maximum Marks: 100

Exam Duration: 3Hours.

Part A: 8 compulsory questions.

One question from each module of Modules I - IV; and two each from Module V & VI.
Student has to answer all questions. (8 x 5)=40

Part B: 3 questions uniformly covering Modules I & II. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part C: 3 questions uniformly covering Modules III & IV. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part D: 3 questions uniformly covering Modules V & VI. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

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Course Number	Course Name	L-T-P	Credits	Year of introduction
HS200	Business Economics	3-0-0	3	2016

Course Objectives

- To familiarize the prospective engineers with elementary Principles of Economics and Managerial Economics;
- To acquaint the students with tools and techniques that are useful in their profession in Managerial Decision Making which will enhance their employability;
- To gain understanding of some Macroeconomic concepts to improve their ability to understand the business climate;
- To prepare and understand balance sheet at an elementary level.

Syllabus

Nature of economics. Demand and Supply Analysis, demand curve, supply curve and equilibrium price determination. Production economics, economies of Scale, optimal quantity determination, Production and Cost functions, the law of Diminishing Marginal Productivity, Costs, Break-Even Analysis Chart Preparation and Cost-Volume-Profit Analysis. Market Structure and Price-Output Decisions under various competition situations and Collusion/Cartel formations in the real life situation. Monetary theory, functions of RBI and NI. Computation and some aspects of macro economics. Capital Budgeting decisions, forecasting techniques and elementary Balance Sheet..

Expected Outcome

A student who has undergone this course

- *would be able to make investment decisions based on capital budgeting methods in alignment with microeconomic and macroeconomic theories.*
- *would be able to analyse the profitability of the firm, economy of operation, determination of price under various market situations with good grasp on the effect of trade cycles in business.*
- *would gain knowledge on Monetary theory, measures by RBI in controlling interest rate and emerging concepts like Bit Coin.*
- *would gain knowledge of elementary accounting concepts used for preparing balance sheet and interpretation of balance sheet*

Course Plan			
Unit	Topics	Hours Allotted	Percentage Marks

IV	Basic concepts of sustainable habitat, Green buildings, green materials for building construction, material selection for sustainable design, green building certification, Methods for increasing energy efficiency of buildings. Sustainable cities, Sustainable transport.	L5	15%
	Students may be assigned to do at least one project eg: a) Consider the design aspects of a sustainable building for your campus b) Explore the different methods that can be adopted for maintaining a sustainable transport system in your city.	P2	
SECOND INTERNAL EXAM			
V	Energy sources: Basic concepts-Conventional and non-conventional, solar energy, Fuel cells, Wind energy, Small hydro plants, bio-fuels, Energy derived from oceans, Geothermal energy.	L5	20%
	Students may be assigned to do at least one project eg: a) Find out the energy savings that can be achieved by the installation of a solar water heater b) Conduct a feasibility study for the installation of wind mills in Kerala	P2	
VI	Green Engineering, Sustainable Urbanisation, industrialisation and poverty reduction; Social and technological change, Industrial Processes: Material selection, Pollution Prevention, Industrial Ecology, Industrial symbiosis.	L5	20%
	Students may be assigned to do a group project eg: a) Collect details for instances of climate change in your locality b) Find out the carbon credits you can gain by using a sustainable transport system (travelling in a cycle or car pooling from college to home) c) Have a debate on the topics like: Industrial Ecology is a Boon or Bane for Industries?/Are we scaring the people on Climate Change unnecessarily?/Technology enables Development sustainable or the root cause of unsustainability?	P3	
END SEMESTER EXAM			

Course code	Course Name	L-T-P - Credits	Year of Introduction
EE465	Power Quality	3-0-0-3	2016

Prerequisite: Nil

Course Objectives:

- To discuss various power quality issues and different methods to control them.

Syllabus:

Power quality issues in distribution systems, Need for power quality monitoring, IEEE guides, standards and recommended practices, Modelling of networks and components under non sinusoidal conditions, Harmonic Analysis, Effects of Power System harmonics on Power System equipment and loads, Harmonic elimination, Power Quality Management in Smart Grid, Electromagnetic Interference.

Expected Outcome:

- The students will be able to identify the power quality problems, causes and suggest suitable mitigating techniques.

References:

- Angelo Baggingi (Ed.) *Handbook of Power Quality*, Wiley, 2008
- C. Sankaran, '*Power Quality*', CRC Press, 2002
- G. T. Heydt, '*Power Quality*', Stars in circle publication, Indiana, 1991
- Jose Arillaga, Neville R. Watson, '*Power System Harmonics*', Wiley, 1997
- Math H. Bollen, '*Understanding Power Quality Problems*' Wiley-IEEE Press, 1999
- R. C. Durgan, M. F. Me Granaghen, H. W. Beaty, '*Electrical Power System Quality*', McGraw-Hill

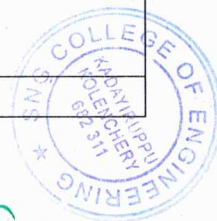
Course Plan

Module	Contents	Hours	Sem. Exam Marks
I	Power quality phenomenon - Sources and Effects of power quality problems, types of power quality disturbances - Voltage sag (or dip), Swell, Transients, short duration voltage variation, Long duration voltage variation, voltage imbalance, waveform distortion, and voltage flicker	6	15%
II	IEEE guide lines, standards and recommended practices. Harmonics -mechanism of harmonic generation-harmonic indices (THD, TIF, DIN, C – message weights - Power Quality Costs Evaluation -. Harmonic sources – Switching devices, arcing devices, saturable devices. Effects of Power System harmonics on Power System equipment and loads.	7	15%
FIRST INTERNAL EXAMINATION			
III	Harmonic Analysis - Fourier series and coefficients, the Fourier transforms, discrete Fourier transform, fast Fourier transform, Window function- numerical problems.	5	15%
IV	Power quality Monitoring considerations: Power line disturbance analyzer, power quality measurement equipment, harmonic spectrum analyzer, flicker meters, disturbance analyzer	7	15%

SECOND INTERNAL EXAMINATION

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V	Harmonic elimination - Design and analysis of filters to reduce harmonic distortion – Power conditioners ,passive filter, active filter - shunt , series, hybrid filters,	7	20%
VI	Power Quality Management in Smart Grid: Power Quality in Smart Grid, Power Quality issues of Grid connected Renewable Energy Sources, Power Quality Conditioners for Smart Grid. Electromagnetic Interference (EMI -introduction - Frequency Classification - Electrical fields-Magnetic Fields - EMI Terminology - Power frequency fields - High frequency	10	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN:

Maximum Marks: 100

Exam Duration: 3Hours.

Part A: 8 compulsory questions.

One question from each module of Modules I - IV; and two each from Module V & VI.

Student has to answer all questions. (8 x5)=40

Part B: 3 questions uniformly covering Modules I & II. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part C: 3 questions uniformly covering Modules III & IV. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part D: 3 questions uniformly covering Modules V & VI. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

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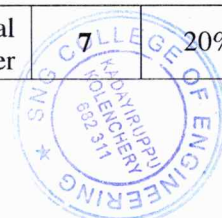
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Course code	Course Name	L-T-P -Credits	Year of Introduction
EE469	Electric and Hybrid Vehicles	3-0-0-3	2016
Prerequisite : Nil			
Course Objectives			
<ul style="list-style-type: none"> To present a comprehensive overview of Electric and Hybrid Electric Vehicles 			
Syllabus			
Introduction to Hybrid Electric Vehicles, Conventional Vehicles, Hybrid Electric Drive-trains, Electric Propulsion unit, Configuration and control of DC Motor drives, Induction Motor drives, Permanent Magnet Motor drives, switched reluctance motor, Energy Storage Requirements in Hybrid and Electric Vehicles, Sizing the drive system, Design of a Hybrid Electric Vehicle , Energy Management Strategies.			
Expected outcome.			
The students will be able to			
<ol style="list-style-type: none"> Choose a suitable drive scheme for developing an electric hybrid vehicle depending on resources Design and develop basic schemes of electric vehicles and hybrid electric vehicles. Choose proper energy storage systems for vehicle applications Identify various communication protocols and technologies used in vehicle networks. 			
Text Book:			
1. Iqbal Hussein, Electric and Hybrid Vehicles: Design Fundamentals, CRC Press, 2003			
References:			
<ol style="list-style-type: none"> James Larminie, John Lowry, Electric Vehicle Technology Explained, Wiley, 2003. Mehrdad Ehsani, YimiGao, Sebastian E. Gay, Ali Emadi, Modern Electric, Hybrid Electric and Fuel Cell Vehicles: Fundamentals, Theory and Design, CRC Press, 2004. 			
Course Plan			
Module	Contents	Hours	Sem. Exam Marks
I	Introduction to Hybrid Electric Vehicles: History of hybrid and electric vehicles, social and environmental importance of hybrid and electric vehicles, impact of modern drive-trains on energy supplies. Conventional Vehicles: Basics of vehicle performance, vehicle power source characterization, transmission characteristics, mathematical models to describe vehicle performance.	7	15%
II	Hybrid Electric Drive-trains: Basic concept of hybrid traction, introduction to various hybrid drive-train topologies, power flow control in hybrid drive-train topologies, fuel efficiency analysis. Electric Drive-trains: Basic concept of electric traction, introduction to various electric drive-train topologies, power flow control in electric drive-train topologies, fuel efficiency analysis.	7	15%
FIRST INTERNAL EXAMINATION			
III	Electric Propulsion unit: Introduction to electric components used in hybrid and electric vehicles, Configuration and control of DC Motor drives, Configuration and control of Induction Motor drives	7	15%
IV	Energy Storage: Introduction to Energy Storage Requirements in Hybrid and Electric Vehicles, Battery based energy storage and its analysis, Fuel Cell based energy storage and its analysis, Hybridization of different energy storage devices.	7	15%
SECOND INTERNAL EXAMINATION			
V	Sizing the drive system: Matching the electric machine and the internal combustion engine (ICE), Sizing the propulsion motor, sizing the power	7	20%

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	electronics, selecting the energy storage technology,		
VI	Communications, supporting subsystems: In vehicle networks- CAN, Energy Management Strategies: Introduction to energy management strategies used in hybrid and electric vehicles, classification of different energy management strategies, comparison of different energy management strategies	7	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN:

Maximum Marks: 100

Exam Duration: 3Hours.

Part A: 8 compulsory questions.

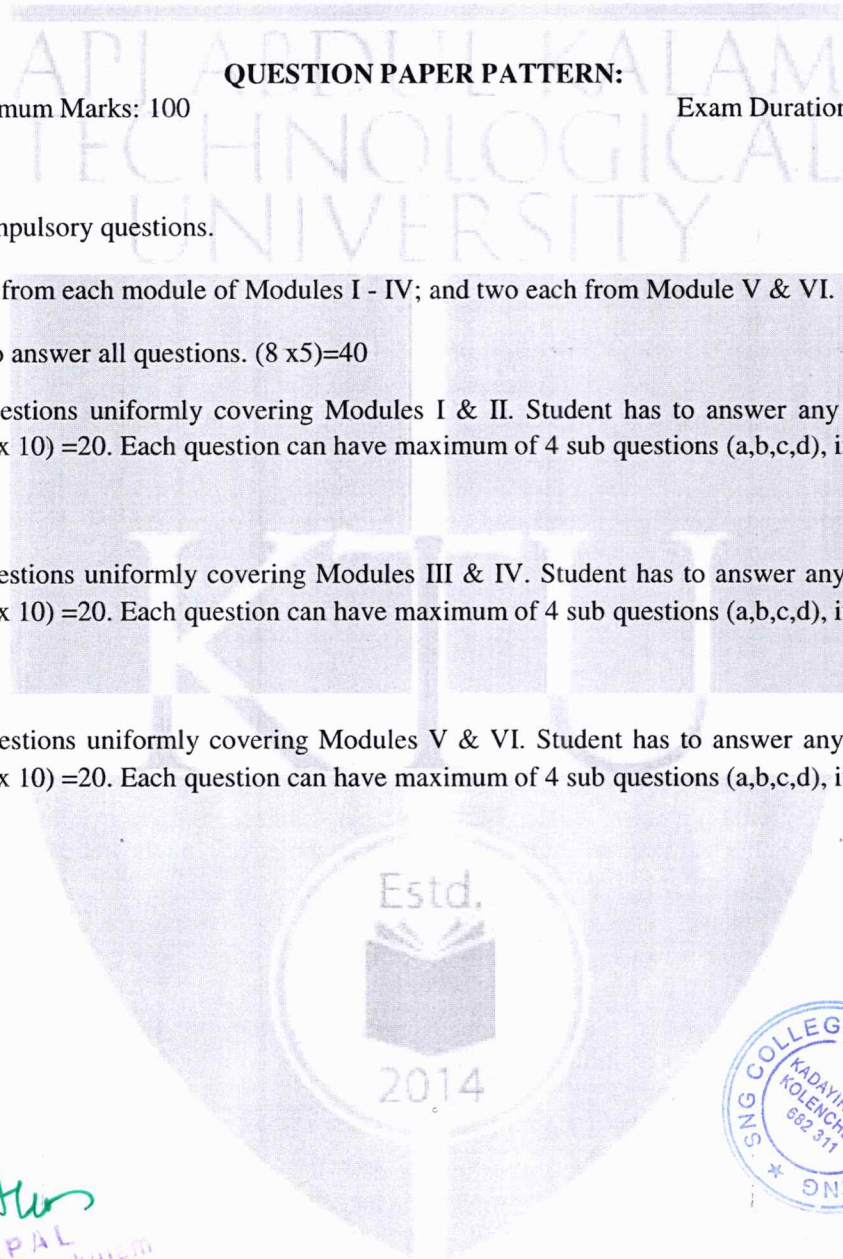
One question from each module of Modules I - IV; and two each from Module V & VI.

Student has to answer all questions. (8 x 5)=40

Part B: 3 questions uniformly covering Modules I & II. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part C: 3 questions uniformly covering Modules III & IV. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.


Part D: 3 questions uniformly covering Modules V & VI. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

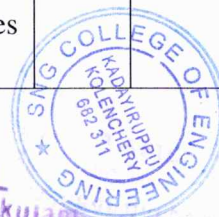


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Course code	Course Name	L-T-P - Credits	Year of Introduction
EE474	ENERGY MANAGEMENT AND AUDITING	3-0-0-3	2016
Prerequisite : Nil			
Course Objectives			
<ul style="list-style-type: none"> To enable the students to understand the concept of energy management and energy management opportunities To understand the different methods used to control peak demand To know energy auditing procedure To understand the different methods used for the economic analysis of energy projects. 			
Syllabus			
General principles of Energy management and Energy management planning - Peak Demand controls - Energy management opportunities in electrical systems and HVAC systems – Reactive power management – Energy audit – cogeneration system – Economic analysis of energy projects			
Expected outcome .			
<ul style="list-style-type: none"> The students will be able to understand the different methods used to reduce energy consumption 			
Data Book (Approved for use in the examination):			
References:			
<ol style="list-style-type: none"> Albert Thumann, William J. Younger, Handbook of Energy Audits, CRC Press, 2003. Charles M. Gottschalk, Industrial energy conservation, John Wiley & Sons, 1996. Craig B. Smith, Energy management principles, Pergamon Press. D. Yogi Goswami, Frank Kreith, Energy Management and Conservation Handbook, CRC Press, 2007 G.G. Rajan, Optimizing energy efficiencies in industry -, Tata McGraw Hill, Pub. Co., 2001. IEEE recommended practice for energy management in industrial and commercial facilities, IEEE std 739 - 1995 (Bronze book). M Jayaraju and Premlet, Introduction to Energy Conservation And Management, Phasor Books, 2008 Paul O'Callaghan, Energy management, McGraw Hill Book Co. Wayne C. Turner, Energy management Hand Book - - The Fairmount Press, Inc., 1997. 			
Course Plan			
Module	Contents	Hours	Sem. Exam Marks
I	General principles of Energy management and Energy management planning. Peak Demand controls, Methodologies, Types of Industrial Loads, Optimal Load scheduling-Case studies.	6	15%
II	Energy management opportunities in Lighting and Motors. Electrolytic Process and Electric heating, Case studies.	8	15%
FIRST INTERNAL EXAMINATION			
III	Types of boilers, Combustion in boilers, Performances evaluation, Feed water treatment, Blow down, Energy conservation opportunities in boiler.		


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	Properties of steam, Assessment of steam distribution losses, Steam leakages, Steam trapping, Condensate and flash steam recovery system, Identifying opportunities for energy savings. Classification, General fuel economy measures in furnaces, Excess air, Heat Distribution, Temperature control, Draft control, Waste heat recovery.	8	15%
IV	HVAC system: Coefficient of performance, Capacity, Factors affecting Refrigeration and Air conditioning system performance and savings opportunities. Classification and Advantages of Waste Heat Recovery system, analysis of waste heat recovery for Energy saving opportunities	7	15%
SECOND INTERNAL EXAMINATION			
V	Energy audit -Definition, Need, Types of energy audit, Energy audit Instruments. Cogeneration-Types and Schemes, Optimal operation of cogeneration plants- Case study. Computer aided energy management.	7	20%
VI	Economic analysis methods-cash flow model, time value of money, evaluation of proposals, pay-back method, average rate of return method, internal rate of return method, present value method, life cycle costing approach, Case studies.	6	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN:

Maximum Marks: 100

Exam Duration: 3Hours.

Part A: 8 compulsory questions.

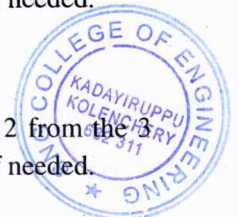
One question from each module of Modules I - IV; and two each from Module V & VI.

Student has to answer all questions. (8 x5)=40

Part B: 3 questions uniformly covering Modules I & II. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part C: 3 questions uniformly covering Modules III & IV. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part D: 3 questions uniformly covering Modules V & VI. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.



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Course code	Course Name	L-T-P-C	Year of Introduction
EE492	Instrumentation Systems	3-0-0-3	2016
Prerequisite: NIL			
Course Objectives			
<ul style="list-style-type: none"> To introduce the measurement techniques of force, torque, speed, pressure, flow & temperature. To introduce different types of electronic circuits for measurements and their applications. 			
Syllabus			
General Concepts ,Generalised Configurations and Functional Description of Measuring Instruments, Measuring Devices, Force and Torque Measurements, Shaft Power Measurements, Pressure and Sound Measurements, Dynamic Testing of Pressure-Measuring Systems, Flow Measurement, Temperature Measurement, Bridge Circuits ,Amplifiers ,Filters, Integration and Differentiation, Voltage-Indicating and Recording Devices,Electromechanical Servo type XT and XY Recorders.			
Expected outcome.			
The students will be able to			
<ol style="list-style-type: none"> Understand and analyze Instrumentation systems. Select proper measurement system for various applications. 			
Text Book:			
1. Ernest O Doebelin and Dhanesh N Manik, Measurement Systems, Mc Graw Hill, 6e.			
References:			
<ol style="list-style-type: none"> Neubert H K P, Instrument Transducers, Oxford University Press, 1975 Turner and Hill, Instrumentation for Engineers and Scientists, Oxford University Press, 1999 			
Course Plan			
Module	Contents	Hours	End Sem. Exam Marks
I	General Concepts : Need for Measurement Systems, Classification of Types of Measurements Applications Generalised Configurations and Functional Description of Measuring Instruments : Functional Elements of an Instrument , Active and Passive Transducers , Analog and Digital Modes of Operation ,Null and Deflection Methods, Input-Output Configurations of Instruments and Measurement Systems	6	15%
II	Measuring Devices : Motion Measurements : Fundamental Standards, Relative Displacements: Translational and Rotational , Relative Velocity : Translational and Rotational, Relative - Acceleration Measurements Force and Torque Measurements : Standards and calibration , Basic Methods of Force Measurements , Characteristics of Elastic Force Transducers, Torque Measurement on Rotating Shafts	8	15%
FIRST INTERNAL EXAMINATION			
III	Shaft Power Measurements : Shaft Power Measurements (Dynamometers) , Vibrating-Wire Force Transducers	8	15%


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	Pressure and Sound Measurements: Standards and Calibration , Basic Methods of Pressure Measurements, Deadweight Gages and Manometers , Elastic Transducers, Vibrating-Cylinder and Other Resonant Transducers		
IV	Dynamic Testing of Pressure-Measuring Systems, High Pressure Measurement, Low Pressure(Vacuum) Measurement, Sound Measurements Flow Measurement :Local Flow Velocity , Magnitude and Direction , Gross Volume Flow Rate	6	15%
SECOND INTERNAL EXAMINATION			
V	Temperature Measurement : Standards and Calibration , Thermal-Expansion Methods ,Thermoelectric Sensors (Thermocouples),Electric-Resistance Sensors, Junction Semiconductor Sensors ,Digital Thermometers ,Radiation Methods	6	20%
VI	Bridge Circuits ,Amplifiers ,Filters, Integration and Differentiation Voltage-Indicating and Recording Devices : Standards and Calibration , Analog Voltmeters and Potentiometers Electrical Instruments : RMS Voltmeter , Ohm Meter , Phase Meter , Q Meter Digital Voltmeters and Multimeters ,Signal Generation Square Wave Generation , Electromechanical Servo type XT and XY Recorders	8	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN:

Maximum Marks: 100

Exam Duration: 3Hrs.

Part A: 8 compulsory questions.

One question from each module of Module I - IV; and two each from Module V & VI.

Student has to answer all questions. (8 x 5)=40

Part B: 3 questions uniformly covering Modules I & II. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part C: 3 questions uniformly covering Modules III & IV. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

Part D: 3 questions uniformly covering Modules V & VI. Student has to answer any 2 from the 3 questions: (2 x 10) =20. Each question can have maximum of 4 sub questions (a,b,c,d), if needed.

CODE	COURSE NAME	CATEGORY	L	T	P	CREDITS
EET322	RENEWABLE ENERGY SYSTEMS	PEC	2	1	0	3

Preamble : This course introduces about different new and renewable sources of energy. Design of some of the systems are also discussed

Prerequisite : Power Systems I

Course Outcomes : After the completion of the course the student will be able to:

CO 1	Describe the environmental aspects of renewable energy resources.
CO 2	Explain the operation of various renewable energy systems.
CO 3	Design solar PV systems.
CO 4	Explain different emerging energy conversion technologies and storage.

Mapping of course outcomes with program outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	3	3										2
CO 2	3	3										2
CO 3	3	3										2
CO 4	3	3										2

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		End Semester Examination
	1	2	
Remember (K1)	10	10	10
Understand (K2)	20	20	40
Apply (K3)	20	20	50
Analyse (K4)	-	-	-
Evaluate (K5)	-	-	-
Create (K6)	-	-	-

End Semester Examination Pattern : There will be two parts; Part A and Part B. Part A contain 10 questions with 2 questions from each module, having 3 marks for each question. Students should answer all questions. Part B contains 2 questions from each module of which student should answer any one. Each question can have maximum 2 sub-divisions and carry 14 marks.


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Syllabus

Module 1

Introduction, Environmental Aspects Of Energy-Ecology-Greenhouse Effect-Global Warming-Pollution-Variou s Pollutants and their Harmful Effects-Green Power-The United Nations Framework Convention On Climate Change (UNFCCC)- Environment-Economy-Energy and Sustainable development-Kyoto Protocol -Classification of Energy Resources; Conventional Energy Resources -Availability and their limitations; Non-Conventional Energy Resources -Classification, Advantages, Limitations; Comparison of Conventional and Non-Conventional Energy Resources; World Energy Scenario; Indian Energy Scenario.

Module 2

SOLAR THERMAL SYSTEMS: Introduction, Solar Constant, Basic Sun-Earth Angles, Measurement of Solar Radiation Data(Numerical Problems)-Pyranometer and Pyrheliometer -Solar Thermal Collectors -General description and characteristics -Flat plate collectors - Heat transfer processes -Solar concentrators(Parabolic trough, Parabolic dish, Central Tower Collector)

SOLAR ELECTRIC SYSTEMS: Introduction- Solar Photovoltaic -Solar Cell fundamentals, characteristics, classification, construction of Module, Panel and Array-Effect of shadowing- .Maximum Power Point Tracker (MPPT) using buck-boost converter. Solar PV Systems - stand-alone and grid connected-Design steps for a Stand-Alone system; Applications -Street lighting, Domestic lighting and Solar Water pumping systems.

Module 3

Wind Energy-Introduction-Wind Turbine Types (HAWT and VAWT) and their construction- Wind power curve-Betz's Law-Power from a wind turbine(Numerical Problems)-Wind energy conversion system(WECS) - Fixed-speed drive scheme-Variable speed drive scheme.-Effect of wind speed and grid condition(system integration).

Small hydro power: Classification as micro, mini and small hydro projects -Basic concepts and types of turbines - Classification, Characteristics and Selection

Module 4

ENERGY FROM OCEAN: Tidal Energy -Principle of Tidal Power, Components of Tidal Power Plant (TPP), Classification of Tidal Power Plants, Advantages and Limitations of TPP. Ocean Thermal Energy Conversion (OTEC): Principle of OTEC system, Methods of OTEC power generation -Open Cycle (Claude cycle), Closed Cycle (Anderson cycle) and Hybrid cycle (block diagram description of OTEC); Site-selection criteria, Biofouling, Advantages & Limitations of OTEC.

Module 5

BIOMASS ENERGY: Introduction, Photosynthesis process, Biomass fuels, Biomass conversion technologies, Urban waste to Energy Conversion, factors affecting biogas generation, types of biogas plants -KVIC and Janata model;

EMERGING TECHNOLOGIES: Fuel Cell, Hydrogen Energy, alcohol energy and power from satellite stations.

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CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT
EET312	BIOMEDICAL INSTRUMENTATION	PEC	2	1	0	3

Preamble : Nil

Prerequisite : Measurements and Instrumentation

Course Outcomes : After the completion of the course, the student will be able to:

CO 1	Explain the basics of anatomy and physiology of human body.
CO 2	Explain different techniques for the measurement of various physiological parameters.
CO 3	Describe modern imaging techniques for medical diagnosis
CO 4	Identify the various therapeutic equipments used in biomedical field
CO 5	Discuss the patient safety measures and recent advancements in medical field.

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO 1	2	-	-	-	-	2	-	-	-	-	-	-
CO 2	2	-	2	-	-	2	-	-	-	-	-	-
CO 3	2	-	2	-	-	2	-	-	-	-	2	-
CO 4	2	2	-	-	-	2	-	-	-	-	2	-
CO 5	2	2	2	-	-	2	-	-	-	-	-	1

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		End Semester Examination
	1	2	
Remember	15	15	30
Understand	20	20	40
Apply	15	15	30
Analyse			
Evaluate			
Create			

End Semester Examination Pattern : There will be two parts; Part A and Part B. **Part A** contain 10 questions (each carrying 3 marks) with 2 questions from each module. Students should answer all questions.

Part B contains 2 questions from each module, out of which students should answer any one. Each question can have maximum 2 subdivisions and carries 14 marks.

Syllabus

Module 1

Human Physiological systems: Brief discussion of Heart and Cardio-vascular system - Physiology of Respiratory system - Anatomy of Nervous and Muscular systems - Problems encountered in measuring living systems

Bioelectric potential: Resting and action potential - Generation and propagation - Bioelectric potentials associated with physiology systems (ECG, EEG and EMG).

Bio potential Electrodes: Theory - Surface electrode - Microelectrode - Needle electrodes.

Transducers for biomedical applications: Transducers for the measurement of pressure, temperature and respiration rate.

Module 2

Measurement of blood pressure: Direct and indirect measurement - Oscillometric method - Ultrasonic method - Measurement of blood flow and cardiac output - Plethysmography - Photo electric and Impedance Plethysmographs - Measurement of heart sounds - Phonocardiography.

Cardiac measurements: Electro-conduction system of the heart - Electro-cardiography - Electrodes and leads - Einthoven triangle - ECG read out devices - ECG machine - block diagram

Module 3

Measurements from the nervous system: Neuronal communication - EEG waveforms and features - 10-20 electrode measurement - EEG Block diagram - Brain-Computer interfacing.

Muscle response: Electromyography - Block diagram of EMG recorders - Nerve conduction velocity measurement

Measurements of respiratory parameters: Spiro meter - Pneumograph

Module 4

Modern Imaging Systems: Basic X-ray machines - CAT scanner - Principle of operation - scanning components - Ultrasonic Imaging principle - types of Ultrasound Imaging - MRI and PET scanning (Principle only).

Therapeutic equipment: Cardiac Pacemakers - De-fibrillators - Hemodialysis machines - Artificial kidney - Lithotripsy - Short wave and Micro wave Diathermy machines



Module 5

Ventilators - Heart Lung machine - Infant Incubators

Instruments for clinical laboratory: Test on blood cells - Chemical tests

Electrical safety: Physiological effects of electric current - Shock hazards from electrical equipment - Method of accident prevention.

Introduction to Tele-medicine - Introduction to medical robotics



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HUT 300	Industrial Economics & Foreign Trade	Category	L	T	P	CREDIT
		HSMC	3	0	0	3

Preamble: To equip the students to take industrial decisions and to create awareness of economic environment.

Prerequisite: Nil

Course Outcomes: After the completion of the course the student will be able to

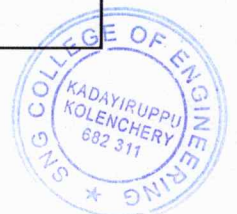
CO1	Explain the problem of scarcity of resources and consumer behaviour, and to evaluate the impact of government policies on the general economic welfare. (Cognitive knowledge level: Understand)
CO2	Take appropriate decisions regarding volume of output and to evaluate the social cost of production. (Cognitive knowledge level: Apply)
CO3	Determine the functional requirement of a firm under various competitive conditions. (Cognitive knowledge level: Analyse)
CO4	Examine the overall performance of the economy, and the regulation of economic fluctuations and its impact on various sections in the society. (Cognitive knowledge level: Analyse)
CO5	Determine the impact of changes in global economic policies on the business opportunities of a firm. (Cognitive knowledge level: Analyse)

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	2										3	
CO2	2	2			2	2	3				3	
CO3	2	2	1								3	
CO4	2	2	1			1					3	
CO5	2	2	1								3	

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Abstract POs defined by National Board of Accreditation			
PO#	Broad PO	PO#	Broad PO
PO1	Engineering Knowledge	PO7	Environment and Sustainability
PO2	Problem Analysis	PO8	Ethics
PO3	Design/Development of solutions	PO9	Individual and team work
PO4	Conduct investigations of complex problems	PO10	Communication
PO5	Modern tool usage	PO11	Project Management and Finance
PO6	The Engineer and Society	PO12	Lifelong learning

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		End Semester Examination Marks
	Test 1 (Marks)	Test 2 (Marks)	
Remember	15	15	30
Understand	20	20	40
Apply	15	15	30

Mark Distribution

Total Marks	CIE Marks	ESE Marks	ESE Duration
150	50	100	3 hours

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Continuous Internal Evaluation Pattern:

Attendance	: 10 marks
Continuous Assessment - Test (2 numbers)	: 25 marks
Continuous Assessment - Assignment	: 15 marks

Internal Examination Pattern:

Each of the two internal examinations has to be conducted out of 50 marks. First series test shall be preferably conducted after completing the first half of the syllabus and the second series test shall be preferably conducted after completing remaining part of the syllabus. There will be two parts: Part A and Part B. Part A contains 5 questions (preferably, 2 questions each from the completed modules and 1 question from the partly completed module), having 3 marks for each question adding up to 15 marks for part A. Students should answer all questions from Part A. Part B contains 7 questions (preferably, 3 questions each from the completed modules and 1 question from the partly completed module), each with 7 marks. Out of the 7 questions, a student should answer any 5.

End Semester Examination Pattern:

There will be two parts; Part A and Part B.

Part A : 30 marks

Part B : 70 marks

Part A contains 10 questions with 2 questions from each module, having 3 marks for each question. Students should answer all questions. Part B contains 2 questions from each module of which a student should answer any one. Each question can have maximum 3 sub-divisions and carries 14 marks.

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SYLLABUS

HUT 300 Industrial Economics & Foreign Trade

Module 1 (Basic Concepts and Demand and Supply Analysis)

Scarcity and choice - Basic economic problems- PPC – Firms and its objectives – types of firms – Utility – Law of diminishing marginal utility – Demand and its determinants – law of demand – elasticity of demand – measurement of elasticity and its applications – Supply, law of supply and determinants of supply – Equilibrium – Changes in demand and supply and its effects – Consumer surplus and producer surplus (Concepts) – Taxation and deadweight loss.

Module 2 (Production and cost)

Production function – law of variable proportion – economies of scale – internal and external economies – Isoquants, isocost line and producer's equilibrium – Expansion path – Technical progress and its implications – Cobb-Douglas production function - Cost concepts – Social cost: private cost and external cost – Explicit and implicit cost – sunk cost - Short run cost curves - long run cost curves – Revenue (concepts) – Shutdown point – Break-even point.

Module 3 (Market Structure)

Perfect and imperfect competition – monopoly, regulation of monopoly, monopolistic competition (features and equilibrium of a firm) – oligopoly – Kinked demand curve – Collusive oligopoly (meaning) – Non-price competition – Product pricing – Cost plus pricing – Target return pricing – Penetration pricing – Predatory pricing – Going rate pricing – Price skimming.

Module 4 (Macroeconomic concepts)

Circular flow of economic activities – Stock and flow – Final goods and intermediate goods - Gross Domestic Product - National Income – Three sectors of an economy- Methods of measuring national income – Inflation- causes and effects – Measures to control inflation- Monetary and fiscal policies – Business financing- Bonds and shares -Money market and Capital market – Stock market – Demat account and Trading account - SENSEX and NIFTY.

Module 5 (International Trade)

Advantages and disadvantages of international trade - Absolute and Comparative advantage theory - Heckscher - Ohlin theory - Balance of payments – Components – Balance of Payments deficit and devaluation – Trade policy – Free trade versus protection – Tariff and non-tariff barriers.

MCN	DISASTER MANAGEMENT	Category	L	T	P	CREDIT	YEAR OF INTRODUCTION
301		Non - Credit	2	0	0	Nil	2019

Preamble: The objective of this course is to introduce the fundamental concepts of hazards and disaster management.

Prerequisite: Nil

Course Outcomes: After the completion of the course the student will be able to

CO1	Define and use various terminologies in use in disaster management parlance and organise each of these terms in relation to the disaster management cycle (Cognitive knowledge level: Understand).
CO2	Distinguish between different hazard types and vulnerability types and do vulnerability assessment (Cognitive knowledge level: Understand).
CO3	Identify the components and describe the process of risk assessment, and apply appropriate methodologies to assess risk (Cognitive knowledge level: Understand).
CO4	Explain the core elements and phases of Disaster Risk Management and develop possible measures to reduce disaster risks across sector and community (Cognitive knowledge level: Apply)
CO5	Identify factors that determine the nature of disaster response and discuss the various disaster response actions (Cognitive knowledge level: Understand).
CO6	Explain the various legislations and best practices for disaster management and risk reduction at national and international level (Cognitive knowledge level: Understand).

Mapping of course outcomes with program outcomes

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1		2				2				2		2
CO2	2	3	2		2	2	3			3		2
CO3	2	3	2	2	2	2	3			3		2
CO4	3	3	3		2	2	3					2
CO5	3	3			2	2	3					2
CO6	3					2	3	3				2

Abstract POs defined by National Board of Accreditation			
PO#	Broad PO	PO#	Broad PO
PO1	Engineering Knowledge	PO7	Environment and Sustainability
PO2	Problem Analysis	PO8	Ethics
PO3	Design/Development of solutions	PO9	Individual and team work
PO4	Conduct investigations of complex problems	PO10	Communication
PO5	Modern tool usage	PO11	Project Management and Finance
PO6	The Engineer and Society	PO12	Life long learning

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Assessment Pattern

Bloom's Category	Continuous Assessment Tests		End Semester Examination Marks
	Test 1 (Marks)	Test 2 (Marks)	
Remember	10	10	20
Understand	25	25	50
Apply	15	15	30
Analyze			
Evaluate			
Create			

Mark Distribution

Total Marks	CIE Marks	ESE Marks	ESE Duration
150	50	100	3 hours

Continuous Internal Evaluation Pattern:

Attendance : 10 marks

Continuous Assessment - Test : 25 marks

Continuous Assessment - Assignment : 15 marks

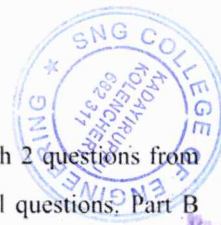
Internal Examination Pattern:

Each of the two internal examinations has to be conducted out of 50 marks. First series test shall be preferably conducted after completing the first half of the syllabus and the second series test shall be preferably conducted after completing remaining part of the syllabus. There will be two parts: Part A and Part B. Part A contains 5 questions (preferably, 2 questions each from the completed modules and 1 question from the partly completed module), having 3 marks for each question adding up to 15 marks for part A. Students should answer all questions from Part A.

Part B contains 7 questions (preferably, 3 questions each from the completed modules and 1 question from the partly completed module), each with 7 marks. Out of the 7 questions, a student should answer any 5.

End Semester Examination Pattern:

There will be two parts; Part A and Part B. Part A contains 10 questions with 2 questions from each module, having 3 marks for each question. Students should answer all questions. Part B contains 2 questions from each module of which a student should answer any one. Each question can have maximum 2 sub-divisions and carries 14 marks.



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SYLLABUS

MCN 301 Disaster Management

Module 1

Systems of earth

Lithosphere- composition, rocks, soils; Atmosphere-layers, ozone layer, greenhouse effect, weather, cyclones, atmospheric circulations, Indian Monsoon; hydrosphere- Oceans, inland water bodies; biosphere

Definition and meaning of key terms in Disaster Risk Reduction and Management- disaster, hazard, exposure, vulnerability, risk, risk assessment, risk mapping, capacity, resilience, disaster risk reduction, disaster risk management, early warning systems, disaster preparedness, disaster prevention, disaster mitigation, disaster response, damage assessment, crisis counselling, needs assessment.

Module 2

Hazard types and hazard mapping; Vulnerability types and their assessment- physical, social, economic and environmental vulnerability.

Disaster risk assessment –approaches, procedures

Module 3

Disaster risk management -Core elements and phases of Disaster Risk Management

Measures for Disaster Risk Reduction – prevention, mitigation, and preparedness.

Disaster response- objectives, requirements; response planning; types of responses.

Relief; international relief organizations.

Module 4

Participatory stakeholder engagement; Disaster communication- importance, methods, barriers; Crisis counselling

Capacity Building: Concept – Structural and Non-structural Measures, Capacity Assessment; Strengthening Capacity for Reducing Risk

Module 5

Common disaster types in India; Legislations in India on disaster management; National disaster management policy; Institutional arrangements for disaster management in India.

The Sendai Framework for Disaster Risk Reduction- targets, priorities for action, guiding principles

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Course Code	Course Name	L-T-P	Credits	Year of Introduction
BT362	Sustainable Energy Processes	3-0-0	3	2016

Prerequisite: Nil

Course Objectives

- To introduce the current and potential future energy systems, covering resources, extraction, conversion, and applications, with emphasis on meeting regional and global energy needs in a sustainable manner.

Syllabus

Classification of energy, extraction, conversion, and applications of solar energy, wind energy, ocean energy, biomass energy, fuel cells and hydro-dynamic systems, merits and demerits of various energy systems, energy storage.

Expected outcome

Students who successfully complete this course should be able to

- Identify global and Indian energy sources.
- Explain capture, conversion and application of solar and wind energy.
- Explain conversion of biomass to energy.
- Explain the capture of energy from oceans.
- Explain fuel cells and energy storage routes.

Reference Books

- Bansal N K, Kleemann M, Michael Meliss, *Renewable Energy Sources & Conversion Technology*, Tata McGraw Hill publishing Company, New Delhi, 1990.
- Boyle, Godfrey, *Renewable Energy*, 3/e, Oxford University Press, 2012.
- S P Sukhatme, *Solar Energy - Principles of Thermal Collection and Storage*, 2/e, Tata McGraw- Hill Publishing company, New Delhi, 1996.
- Pramod Jain, *Wind Energy Engineering*, McGraw Hill, 2011.
- Donald L Klass, *Biomass for Renewable Energy, Fuels and Chemicals*, Academic Press, 1998.

Course Plan

Module	Contents	Hours	Sem. Exam Marks
I	General classification of energy. Conventional and non-conventional. Renewable and non-renewable. Global and Indian energy sources. Global and Indian energy consumption. Problems of fossil fuels. Environmental aspects of energy utilization. Energy and sustainable development. Energy planning. Renewable energy sources, potentials, achievements and applications.	7	15%
II	Solar energy. Solar radiation. Solar thermal systems. Flat plate and concentrating collectors. Solar desalination. Solar pond. Solar cookers. Solar dryers. Solar thermal electric power plant. Solar photovoltaic conversion. Semiconductor and thin film technology. Solar cells. Solar photovoltaic power generation. Hybrid systems. Merits and limitations of solar energy.	7	15%

FIRST INTERNAL EXAM

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III	Wind energy. Availability of wind energy, Site characteristics, Wind turbine types-horizontal axis and vertical axis-design principles of wind turbine. Wind power plants, Wind energy storage. Safety and environmental aspects. Merits and limitations of wind energy.	7	15%
IV	Biomass energy. Biomass resources, Biomass conversion technologies-direct combustion, pyrolysis, biomass gasification. Biogas production. Biomethanation as an aid to environment improvement. Bioethanol, biodiesel and biobutanol production. Hydrogen as fuel. Biohydrogen production. Storage of hydrogen.	7	15%
SECOND INTERNAL EXAM			
V	Energy from the oceans. Ocean thermal electric conversion. Tidal energy conversion. Geothermal energy conversion. Hydro power-global and Indian scenario. Positive and negative attributes of hydropower. Electricity from hydropower. Small hydropower.	7	20%
VI	Fuel cells. Alkaline fuel cells. Phosphoric acid fuel cell. Molten carbonate fuel cell. Solid oxide fuel cell, Solid polymer electrolyte fuel cell. Magneto-hydrodynamic systems. Electric vehicles. Energy storage routes like thermal, chemical, mechanical, electrical storage. Batteries.	7	20%
END SEMESTER EXAMINATION			

QUESTION PAPER PATTERN:

Maximum Marks: 100

Exam Duration: 3 hours

The question paper consists of Part A, Part B and Part C.

Part A consists of three questions of 15 marks each uniformly covering Modules I and II. The student has to answer two questions ($15 \times 2 = 30$ marks).

Part B consists of three questions of 15 marks each uniformly covering Modules III and IV. The student has to answer two questions ($15 \times 2 = 30$ marks).

Part C consists of three questions of 20 marks each uniformly covering Modules V and VI. The student has to answer two questions ($20 \times 2 = 40$ marks).

For each question there can be a maximum of 4 subparts.



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COURSE CODE	COURSE NAME	L-T-P-C	YEAR OF INTRODUCTION
EC365	Biomedical Engineering	3-0-0-3	2016

Prerequisite: Nil

Course objectives:

1. To introduce student to basic biomedical engineering technology
2. To understand the anatomy & physiology of major systems of the body in designing equipment for medical treatments.
3. To impart knowledge about the principle and working of different types of bio-medical electronic equipment/devices.

Syllabus:

Human body-overview, Physiological systems of body, Measurement of physiological parameters, Assisting and therapeutic devices, Medical laboratory equipments, Telemetry in patient care, Patient safety, Medical imaging system

Expected outcome:

The students will be able:

1. To understand diagnosis and therapy related equipments.
2. To understand the problem and identify the necessity of equipment for diagnosis and therapy.
3. To understand the importance of electronics engineering in medical field.
4. To understand the importance of telemetry in patient care

Text Books:

1. K S Kandpur, "Hand book of Biomedical instrumentation", Tata McGraw Hill 2nd e/d.
2. Leslie Cromwell, Fred J. Weibell, Erich A. Pfeiffer, Biomedical Instrumentation and Measurements, PHI, 2nd Edition, 2004

References:

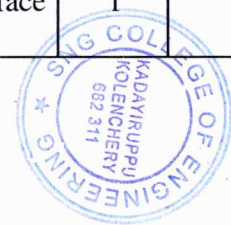
1. Barbara Christe, Introduction to Biomedical Instrumentation, Cambridge University Press, 2008.
2. J. J. Carr, "Introduction to Biomedical Equipment Technology", Pearson Education 4th e/d.
3. John G Webster, "Medical Instrumentation application and design", John Wiley 3rd e/d.
4. Richard Aston, "Principle of Biomedical Instrumentation and Measurement". Merrill Education/Prentice Hall.

Course Plan

Module	Course content	Hours	End Sem. Exam Marks
I	Introduction to bio-medical instrumentation system, overview of anatomy and physiological systems of the body.	1	15
	Sources of bio-electric potential: Resting and action potential, propagation of action potentials. Bioelectric potentials examples (ECG, EEG, EMG, ERG, EOG, EGG, etc introduction only.)	2	
	Electrode theory: Nernst relation Bio potential electrodes: Microelectrodes, skin surface electrodes, needle electrodes.	1	

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	Instrumentation for clinical laboratory: Bio potential amplifiers-instrumentation amplifiers, carrier amplifiers, isolation amplifiers, chopper amplifiers	2	
II	Heart and cardiovascular system (brief discussion), electro conduction system of the heart. Electrocardiography, ECG machine block diagram, ECG lead configurations, ECG recording system, Einthoven triangle, analysis of ECG signals.	3	15
	Measurement of blood pressure: Direct, indirect and relative methods of blood pressure measurement, auscultatory method, oscillometric and ultrasonic non-invasive pressure measurements.	2	
	Measurement of blood flow: Electromagnetic blood flow meters and ultrasonic blood flow meters.	2	
FIRST INTERNAL EXAM			
III	The human nervous system. Neuron, action potential of brain, brain waves, types of electrodes, placement of electrodes, evoked potential, EEG recording, analysis of EEG.	2	15
	Electromyography: Nerve conduction velocity, instrumentation system for EMG.	1	
	Physiology of respiratory system (brief discussion), Respiratory parameters, spirometer, body plethysmographs, gas exchange and distribution.	2	
	Instruments for clinical laboratory: Oxymeters, pH meter, blood cell counter, flame photometer, spectrophotometer	3	
IV	Therapeutic Equipments: Principle, block schematic diagram, working and applications of : pacemakers, cardiac defibrillators, heart-lung machine, dialyzers, surgical diathermy equipment, ventilators	6	15
SECOND INTERNAL EXAM			
V	Medical Imaging systems (Basic Principle only): X-ray imaging - Properties and production of X-rays, X-ray machine, applications of X-rays in medicine.	2	20
	Computed Tomography: Principle, image reconstruction, scanning system and applications.	2	
	Ultrasonic imaging systems: Basic pulse echo system, propagation of ultrasonic through tissues and reflections, display types, A-Scan, B-Scan, M-Scan, applications, real-time ultrasonic imaging systems and probes.	3	
VI	Magnetic Resonance Imaging – Basic NMR components, Biological effects and advantages of NMR imaging	3	20
	Biomedical Telemetry system: Components of biotelemetry system, application of telemetry in medicine, single channel telemetry system for ECG and temperature	2	
	Patient Safety: Electric shock hazards, leakage current, safety codes for electro medical equipments	1	
END SEMESTER EXAM			



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COURSE CODE	COURSE NAME	L-T-P-C	YEAR OF INTRODUCTION
EC468	SECURE COMMUNICATION	3-0-0 -3	2016
Prerequisite: EC407 COMPUTER COMMUNICATION			
Course objectives: •To impart the students about the theory and technology behind the secure communication.			
Syllabus: Introduction on Security, Security Goals, Types of Attacks, Modular arithmetic: Groups, Ring, Fields. The Euclidean algorithm, Finite fields of the form GF(p), Polynomial arithmetic, Symmetric Ciphers, Symmetric Cipher Model, Substitution Techniques, Transposition techniques, Block Ciphers, Data encryption Standards, Differential and Linear Crypt analysis Advanced Encryption standard, The AES Cipher, Public key cryptosystem, RSA algorithm, Intruders, Password management			
Expected outcome: The student will be <ul style="list-style-type: none"> i. Exposed to the different approaches that handle security and the algorithms in use for maintaining data integrity and authenticity. ii. Enabled student to appreciate the practical aspects of security features design and their implementation 			
Text Books: <ol style="list-style-type: none"> 1. Behrouz A. Forouzan , Cryptography and Network security Tata McGraw-Hill, 2008 2. William Stallings, Cryptography and Network security: principles and practice", 2nd Edition, Prentice Hall of India, New Delhi, 2002 			
References: <ol style="list-style-type: none"> 1. David S. Dummit & Richard M Foote, Abstract Algebra, 2nd Edition, Wiley India Pvt. Ltd., 2008. 2. Douglas A. Stinson, Cryptography, Theory and Practice, 2/e, Chapman & Hall, CRC Press Company, Washington, 2005. 3. Lawrence C. Washington, Elliptic Curves: Theory and Cryptography, Chapman & Hall, CRC Press Company, Washington, 2008. 4. N. Koblitz: A course in Number theory and Cryptography, 2008 5. Thomas Koshy: Elementary Number Theory with Applications, 2/e, Academic Press, 2007 6. Tyagi and Yadav , Cryptography and network security, Dhanpatrai, 2012 			
Course Plan			
Module	Course contents	Hours	End Sem. Exam Marks
I	Introduction on security, security goals and types of attacks: Passive attack, active attack, attacks on confidentiality, attacks on integrity and availability, Security services and mechanisms.	5	15%
II	Modular arithmetic: Groups, Ring, Fields. The Euclidean algorithm, Finite fields of the form GF(p)	4	15%
	Polynomial arithmetic: Finite fields of the form GF (2n).	4	
FIRST INTERNAL EXAM			
III	Symmetric Ciphers, Symmetric Cipher Model	3	15%



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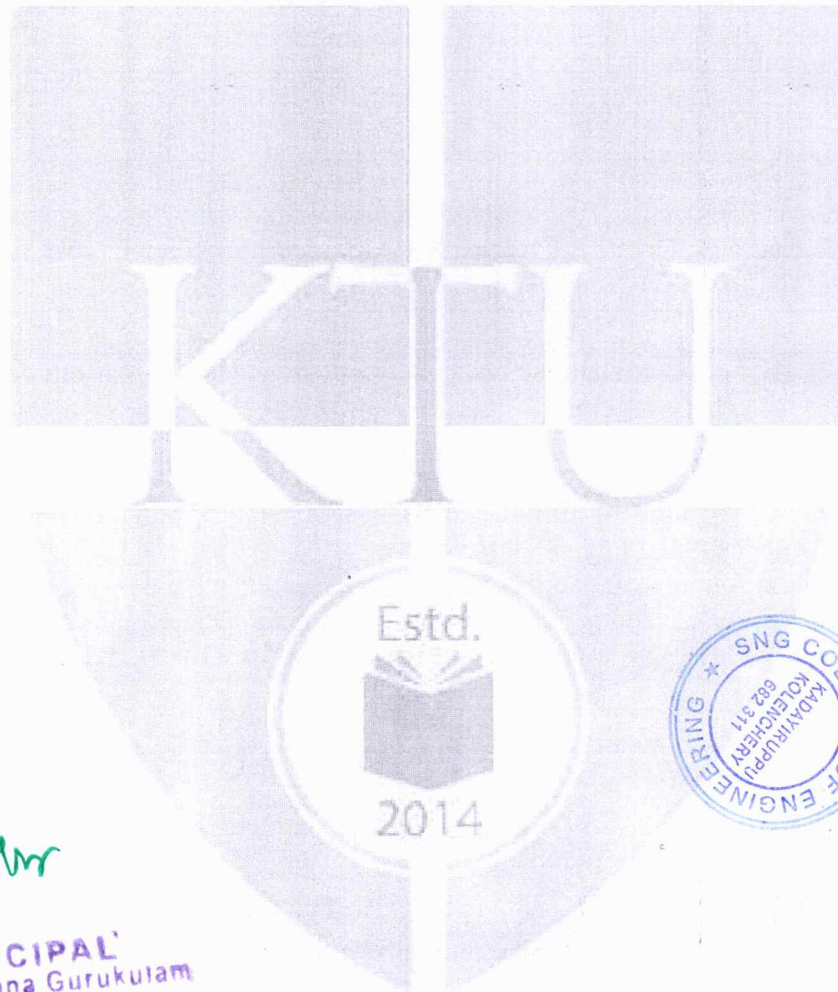
Question Paper Pattern (End Sem. Exam)

Maximum Marks: 100

Time : 3 hours

The question paper shall consist of three parts. Part A covers modules I and II, Part B covers modules III and IV, and Part C covers modules V and VI. Each part has three questions uniformly covering the two modules and each question can have maximum four subdivisions. In each part, any two questions are to be answered. Mark patterns are as per the syllabus with 100 % for theory.

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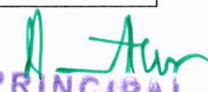


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Course code	Course Name	L-T-P -Credits	Year of Introduction
FS482	RESPONSIBLE ENGINEERING	3-0-0-3	2016
Prerequisite : Nil			
Course Objectives <ul style="list-style-type: none"> To enable the students to create an awareness on responsibilities and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others. 			
Syllabus Human Values - Engineering Ethics – Engineering as Social Experimentations – Engineer’s responsibility for safety – Responsibilities and Rights – Global Issues.			
Expected outcome. <ul style="list-style-type: none"> The students will be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society 			
Text Books: <ol style="list-style-type: none"> Mike W. Martin and Roland Schinzinger, “Ethics in Engineering”, Tata McGraw Hill, New Delhi, 2003. Govindarajan M, Natarajan S, Senthil Kumar V. S, “Engineering Ethics”, Prentice Hall of India, New Delhi, 2004. 			
Data Book (Approved for use in the examination): Nil			
References: <ol style="list-style-type: none"> Charles B. Fleddermann, “Engineering Ethics”, Pearson Prentice Hall, New Jersey, 2004. Charles E. Harris, Michael S. Pritchard and Michael J. Rabins, “Engineering Ethics – Concepts and Cases”, Cengage Learning, 2009 John R Boatright, “Ethics and the Conduct of Business”, Pearson Education, New Delhi, 2003 Edmund G Seebauer and Robert L Barry, “Fundamentals of Ethics for Scientists and Engineers”, Oxford University Press, Oxford, 2001 Laura P. Hartman and Joe Desjardins, “Business Ethics: Decision Making for Personal Integrity and Social Responsibility” Mc Graw Hill education, India Pvt. Ltd., New Delhi 2013. 			
Course Plan			
Module	Contents	Hours	End Sem. Exam Marks
I	HUMAN VALUES Morals, values and Ethics – Integrity – Work ethic – Service learning – Civic virtue – Respect for others – Living peacefully – Caring – Sharing – Honesty – Courage – Valuing time – Cooperation – Commitment – Empathy – Self confidence – Character – Spirituality – Introduction to Yoga and meditation for professional excellence and stress management.	8	15%
II	ENGINEERING ETHICS Senses of „Engineering Ethics“ – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral Autonomy – Kohlberg’s theory – Gilligan’s theory – Consensus and Controversy – Models of professional roles - Theories about right action – Self-interest – Customs and Religion – Uses of Ethical Theories	6	15%
FIRST INTERNAL EXAMINATION			




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	Substitution Techniques, Caesar Cipher, Mono alphabetic Cipher, Play fair cipher, Hill cipher, Poly alphabetic Cipher, one time pad	4	
IV	Transposition techniques ,Block Ciphers, Data encryption Standards, DES Encryption, DES decryption	3	15%
	Differential and Linear Crypt analysis Advanced Encryption standard	2	
	The AES Cipher, substitute bytes transformation, Shift row transformation, Mix Column transformation.	2	
SECOND INTERNAL EXAM			
V	Public key cryptosystem, Application for Public key cryptosystem requirements	2	20%
	RSA algorithm, Key management, Distribution of public key, public key certificates, Distribution of secret keys.	5	
VI	Intruders: Intrusion techniques, Intrusion detection, Statistical anomaly detection, Rule based intrusion detection, Distributed intrusion detection, Honey pot, Intrusion detection exchange format.	5	20%
	Password management: Password protection, password selection strategies.	2	
END SEMESTER EXAM			

Question Paper Pattern

The question paper shall consist of three parts. Part A covers modules I and II, Part B covers modules III and IV, and Part C covers modules V and VI. Each part has three questions uniformly covering the two modules and each question can have maximum four subdivisions. In each part, any two questions are to be answered. Mark patterns are as per the syllabus with 50% for theory and 50% for logical/numerical problems, derivation and proof.

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CODE MCN201	SUSTAINABLE ENGINEERING	CATEGORY	L	T	P	CREDIT
			2	0	0	NIL

Preamble: Objective of this course is to inculcate in students an awareness of environmental issues and the global initiatives towards attaining sustainability. The student should realize the potential of technology in bringing in sustainable practices.

Prerequisite: NIL

Course Outcomes: After the completion of the course the student will be able to

CO 1	Understand the relevance and the concept of sustainability and the global initiatives in this direction
CO 2	Explain the different types of environmental pollution problems and their sustainable solutions
CO 3	Discuss the environmental regulations and standards
CO 4	Outline the concepts related to conventional and non-conventional energy
CO 5	Demonstrate the broad perspective of sustainable practices by utilizing engineering knowledge and principles

Mapping of course outcomes with program outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1						2	3					2
CO 2						2	3					2
CO 3						2	3					2
CO 4						2	3					2
CO 5						2	3					2

Assessment

PatternMark

distribution

Bloom's Category	Continuous Assessment Tests		End Semester Examination
	1	2	
Remember	20	20	40
Understand	20	20	40
Apply	10	10	20
Analyse			
Evaluate			
Create			

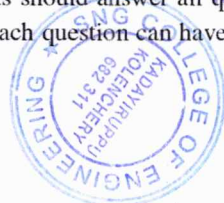
Continuous Internal Evaluation Pattern:

Attendance : 10 marks
 Continuous Assessment Test (2 numbers) : 25 marks
 Assignment/Quiz/Course project : 15 marks

End Semester Examination Pattern: There will be two parts; Part A and Part B. Part A contain 10 questions with 2 questions from each module, having 3 marks for each question. Students should answer all questions. Part B contains 2 questions from each module of which student should answer any one. Each question can have maximum 2 sub-divisions and carry 14 marks.

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III	ENGINEERING AS SOCIAL EXPERIMENTATION Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.	7	15%
IV	ENGINEER'S RESPONSIBILITY FOR SAFETY Safety and Risk – Assessment of Safety and Risk – Risk Benefit Analysis – Reducing Risk – The Government Regulator's Approach to Risk - Chernobyl Case Studies and Bhopal	7	15%
SECOND INTERNAL EXAMINATION			
V	RESPONSIBILITIES AND RIGHTS Collegiality and Loyalty – Respect for Authority - Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Intellectual Property Rights (IPR) – Discrimination.	6	20%
VI	GLOBAL ISSUES Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Code of Conduct – Corporate Social Responsibility.	6	20%
END SEMESTER EXAM			

QUESTION PAPER PATTERN

Maximum Marks: 100

Exam Duration: 3 hours

Part A – 8 questions (Module 1 to 4 one question each, Module 5 & 6 two questions each) of 2 marks each. All questions are compulsory (8x2 = 16)

Part B – 8 questions (Module 1 to 4 one question each, Module 5 & 6 two questions each) of 3 marks each. All questions are compulsory (8x3 = 24)

Part C – 12 questions (two questions from each module) of 10 marks each. Student has to answer one question from each module. (6x10=60)

Note: Each question can have a maximum of 4 sub parts, if needed.

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CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT
EST 200	DESIGN AND ENGINEERING		2	0	0	2

Preamble:

The purpose of this course is to

- i) introduce the undergraduate engineering students the fundamental principles of design engineering,
- ii) make them understand the steps involved in the design process and
- iii) familiarize them with the basic tools used and approaches in design.

Students are expected to apply design thinking in learning as well as while practicing engineering, which is very important and relevant for today. Case studies from various practical situations will help the students realize that design is not only concerned about the function but also many other factors like customer requirements, economics, reliability, etc. along with a variety of life cycle issues.

The course will help students to consider aesthetics, ergonomics and sustainability factors in designs and also to practice professional ethics while designing.

Prerequisite:

Nil. The course will be generic to all engineering disciplines and will not require specialized preparation or prerequisites in any of the individual engineering disciplines.

Course Outcomes:

After the completion of the course the student will be able to

CO 1	Explain the different concepts and principles involved in design engineering.
CO 2	Apply design thinking while learning and practicing engineering.
CO 3	Develop innovative, reliable, sustainable and economically viable designs incorporating knowledge in engineering.

Mapping of course outcomes with program outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	2	1					1			1		
CO 2		2				1		1				2
CO 3			2			1	1		2	2		1

Assessment Pattern

Continuous Internal Evaluation (CIE) Pattern:

Attendance : 10 marks
Continuous Assessment Test (2 numbers) : 25 marks
Assignment/Quiz/Course project : 15 marks

End Semester Examination (ESE) Pattern: There will be two parts; Part A and Part B.

Part A : 30 marks

part B : 70 marks

Part A contains 10 questions with 2 questions from each module, having 3 marks for each question. Students should answer all questions.

Part B contains 2 case study questions from each module of which student should answer any one. Each question carry 14 marks and can have maximum 2 sub questions.

Mark distribution

Total Marks	CIE	ESE	ESE Duration
150	50	100	3 hours

Bloom's Category	Continuous Assessment Tests		End Semester Examination
	1	2	
Remember	5	5	10
Understand	10	10	20
Apply	35	35	70
Analyse	-	-	-
Evaluate	-	-	-
Create	-	-	-

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Course Level Assessment Questions

Course Outcome 1 (CO1): Appreciate the different concepts and principles involved in design engineering.

1. State how engineering design is different from other kinds of design
2. List the different stages in a design process.
3. Describe design thinking.
4. State the function of prototyping and proofing in engineering design.
5. Write notes on the following concepts in connection with design engineering 1) Modular Design, 2) Life Cycle Design, 3) Value Engineering, 4) Concurrent Engineering, and 5) Reverse Engineering
6. State design rights.

Course Outcome 2 (CO2) Apply design thinking while learning and practicing engineering.

1. Construct the iterative process for design thinking in developing simple products like a pen, umbrella, bag, etc.
2. Show with an example how divergent-convergent thinking helps in generating alternative designs and then how to narrow down to the best design.
3. Describe how a problem-based learning helps in creating better design engineering solutions.
4. Discuss as an engineer, how ethics play a decisive role in your designs

Course Outcome 3 (CO3): Develop innovative, reliable, sustainable and economically viable designs incorporating different segments of knowledge in engineering.

1. Illustrate the development of any simple product by passing through the different stages of design process
2. Show the graphical design communication with the help of detailed 2D or 3D drawings for any simple product.
3. Describe how to develop new designs for simple products through bio-mimicry.



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Syllabus

Module 1

Design Process:- Introduction to Design and Engineering Design, Defining a Design Process:-Detailing Customer Requirements, Setting Design Objectives, Identifying Constraints, Establishing Functions, Generating Design Alternatives and Choosing a Design.

Module 2

Design Thinking Approach:-Introduction to Design Thinking, Iterative Design Thinking Process Stages: Empathize, Define, Ideate, Prototype and Test. Design Thinking as Divergent-Convergent Questioning. Design Thinking in a Team Environment.

Module 3

Design Communication (Languages of Engineering Design):-Communicating Designs Graphically, Communicating Designs Orally and in Writing. Mathematical Modeling In Design, Prototyping and Proofing the Design.

Module 4

Design Engineering Concepts:-Project-based Learning and Problem-based Learning in Design.Modular Design and Life Cycle Design Approaches. Application of Biomimicry,Aesthetics and Ergonomics in Design. Value Engineering, Concurrent Engineering, and Reverse Engineering in Design.

Module 5

Expediency, Economics and Environment in Design Engineering:-Design for Production, Use, and Sustainability. Engineering Economics in Design. Design Rights. Ethics in Design

Text Books

- 1) YousefHaik, SangarappillaiSivaloganathan, Tamer M. Shahin, Engineering Design Process, Cengage Learning 2003, Third Edition, ISBN-10: 9781305253285,
- 2) Voland, G., Engineering by Design, Pearson India 2014, Second Edition, ISBN 9332535051

Reference Books

- 1.Philip Kosky, Robert Balmer, William Keat, George Wise, Exploring Engineering, Fourth Edition: An Introduction to Engineering and Design, Academic Press 2015, 4th Edition, ISBN: 9780128012420.
2. Clive L. Dym, Engineering Design: A Project-Based Introduction, John Wiley & Sons, New York 2009, Fourth Edition, ISBN: 978-1-118-32458-5
3. Nigel Cross, Design Thinking: Understanding How Designers Think and Work, Berg Publishers 2011, First Edition, ISBN: 978-1847886361
4. Pahl, G., Beitz, W., Feldhusen, J., Grote, K.-H., Engineering Design: A Systematic Approach, Springer 2007, Third Edition, ISBN 978-1-84628-319-2



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Course Contents and Lecture Schedule

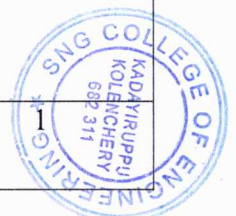
No	Topic	No. of Lectures
1	<u>Module 1: Design Process</u>	
1.1	Introduction to Design and Engineering Design. <i>What does it mean to design something? How Is engineering design different from other kinds of design? Where and when do engineers design? What are the basic vocabulary in engineering design? How to learn and do engineering design.</i>	1
1.2	<i>Defining a Design Process-: Detailing Customer Requirements.</i> <i>How to do engineering design? Illustrate the process with an example. How to identify the customer requirements of design?</i>	1
1.3	<i>Defining a Design Process-: Setting Design Objectives, Identifying Constraints, Establishing Functions.</i> <i>How to finalize the design objectives? How to identify the design constraints? How to express the functions a design in engineering terms?</i>	1
1.4	<i>Defining a Design Process-: Generating Design Alternatives and Choosing a Design.</i> <i>How to generate or create feasible design alternatives? How to identify the "best possible design"?</i>	1
1.5	Case Studies:- Stages of Design Process. <i>Conduct exercises for designing simple products going through the different stages of design process.</i>	1
2	<u>Module 2: Design Thinking Approach</u>	
2.1	Introduction to Design Thinking <i>How does the design thinking approach help engineers in creating innovative and efficient designs?</i>	1
2.2	Iterative Design Thinking Process Stages: Empathize, Define, Ideate, Prototype and Test. <i>How can the engineers arrive at better designs utilizing the iterative design thinking process (in which knowledge acquired in the later stages can be applied back to the earlier stages)?</i>	1
2.3	Design Thinking as Divergent-Convergent Questioning. <i>Describe how to create a number of possible designs and then how to refine and narrow down to the 'best design'.</i>	1
2.4	Design Thinking in a Team Environment. <i>How to perform design thinking as a team managing the conflicts ?</i>	1
2.5	Case Studies: Design Thinking Approach. <i>Conduct exercises using the design thinking approach for</i>	1



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	<i>designing any simple products within a limited time and budget</i>	
3	Module 3: Design Communication (Languages of Engineering Design)	
3.1	Communicating Designs Graphically. <i>How do engineering sketches and drawings convey designs?</i>	1
3.2	Communicating Designs Orally and in Writing. <i>How can a design be communicated through oral presentation or technical reports efficiently?</i>	1
First Series Examination		
3.3	Mathematical Modelling in Design. <i>How do mathematics and physics become a part of the design process?</i>	1
3.4	Prototyping and Proofing the Design. <i>How to predict whether the design will function well or not?</i>	1
3.5	Case Studies: Communicating Designs Graphically. <i>Conduct exercises for design communication through detailed 2D or 3D drawings of simple products with design detailing, material selection, scale drawings, dimensions, tolerances, etc.</i>	1
4	Module 4: Design Engineering Concepts	
4.1	Project-based Learning and Problem-based Learning in Design. <i>How engineering students can learn design engineering through projects?</i> <i>How students can take up problems to learn design engineering?</i>	1
4.2	Modular Design and Life Cycle Design Approaches. <i>What is modular approach in design engineering? How it helps?</i> <i>How the life cycle design approach influences design decisions?</i>	1
4.3	Application of Bio-mimicry, Aesthetics and Ergonomics in Design. <i>How do aesthetics and ergonomics change engineering designs?</i> <i>How do the intelligence in nature inspire engineering designs? What are the common examples of bio-mimicry in engineering?</i>	1
4.4	Value Engineering, Concurrent Engineering, and Reverse Engineering in Design. <i>How do concepts like value engineering , concurrent engineering and reverse engineering influence engineering designs?</i>	1
4.5	Case Studies: Bio-mimicry based Designs. <i>Conduct exercises to develop new designs for simple</i>	1

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	<i>products using bio-mimicry and train students to bring out new nature inspired designs.</i>	
5	<u>Module 5: Expediency, Economics and Environment in Design Engineering</u>	
5.1	Design for Production, Use, and Sustainability. <i>How designs are finalized based on the aspects of production methods, life span, reliability and environment?</i>	1
5.2	Engineering Economics in Design. <i>How to estimate the cost of a particular design and how will economics influence the engineering designs?</i>	1
5.3	Design Rights. <i>What are design rights and how can an engineer put it into practice?</i>	1
5.4	Ethics in Design. <i>How do ethics play a decisive role in engineering design?</i>	1
5.5	Case Studies: Design for Production, Use, and Sustainability. <i>Conduct exercises using simple products to show how designs change with constraints of production methods, life span requirement, reliability issues and environmental factors.</i>	1
Second Series Examination		



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CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT
CS 341	DESIGN PROJECT					

Course Objectives

- To understand the engineering aspects of design with reference to simple products
- To foster innovation in design of products, processes or systems
- To develop design that add value to products and solve technical problems

Course Plan

Study : Take minimum three simple products, processes or techniques in the area of specialisation, study, analyse and present them. The analysis shall be focused on functionality, strength, material, manufacture/construction, quality, reliability, aesthetics, ergonomics, safety, maintenance, handling, sustainability, cost etc. whichever are applicable. Each student in the group has to present individually; choosing different products, processes or techniques.

Design: The project team shall identify an innovative product, process or technology and proceed with detailed design. At the end, the team has to document it properly and present and defend it. The design is expected to concentrate on functionality, design for strength is not expected.

Note : The one hour/week allotted for tutorial shall be used for discussions and presentations. The project team (not exceeding four) can be students from different branches, if the design problem is multidisciplinary.

Evaluation

First evaluation (Immediately after first internal examination)	20 marks
Second evaluation (Immediately after second internal examination)	20 marks
Final evaluation (Last week of the semester)	60 marks

Note: All the three evaluations are mandatory for course completion and for awarding the final grade.

Course code	Course Name	L-T-P - Credits	Year of Introduction
RLMCA274	Business Intelligence and its Applications	3-1-0-4	2016
Course Objectives			
<ul style="list-style-type: none"> To understand Business Intelligence (BI) systems. To impart knowledge on design of BI solutions for different BI targets and users. To learn the role that software tools/applications play in BI with emphasis on industrial case studies and practical applications 			
Syllabus			
Decision intelligence, Computerised support, Decision support systems concepts, methodologies and technologies, Modelling analysis, mining for business intelligence, Artificial neural networks for data mining, Text and web mining, Data warehousing			
Expected Outcome			
The students will be able to			
<ol style="list-style-type: none"> Differentiate between Transaction Processing and Analytical applications and describe the need for Business Intelligence. Demonstrate understanding of technology and processes associated with Business Intelligence Framework. Select appropriate DM tools and methods to manipulate and achieve data. Demonstrate understanding of Data Warehouse implementation methodology and project life cycle. Identify the metrics, indicators and make recommendations to achieve the business goal for given business scenario. 			
References			
<ol style="list-style-type: none"> Bert Brijs, Business Analysis for Business Intelligence, CRC press. Efraim Turban, Ramesh Sharda, Dursun Delen, Decision Support Intelligence Systems, 9th edition Pearson Education, 2014. Jiawei Han, Micheline Kamber "Data Mining Concepts and Techniques", Second Edition, Elsevier. Reprinted 2008. 			
Course Plan			
Module	Contents	Hours	Sem. Exam Marks
I	Decision support and business intelligence – introduction, changing business environments, managing decision making, computerized support for decision making, an early framework, work system view, major tools and techniques, plan.	8	10%
II	Computerized decision support – introduction and definitions, models, phases of decision making processes, intelligence phase, design phase, choice phase, implementation phase.	8	10%
FIRST INTERNAL EXAMINATION			
III	Decision support systems concepts, methodologies and technologies – decision support system configurations, description, characteristics and capabilities, classifications, components of decision support systems, data management subsystem, model management subsystem, user interface subsystem, knowledge based management subsystem.	10	20%
IV	Modelling and analysis- management support systems modelling, certainty, uncertainty, risk, decision analysis with decision tables and decision. Data mining for business intelligence- data mining	10	20%

	concepts and applications, data mining applications, data mining process, data mining methods, data mining software tools.		
V	Artificial neural networks for data mining- basic concepts of neural networks, learning in artificial neural networks, Text and web mining – text mining concepts and definitions, natural language processing, text mining applications, text mining process, text mining tools, web mining overview, web content mining and web structure mining.	9	20%
SECOND INTERNAL EXAMINATION			
VI	Data warehousing – data warehousing concepts and definitions, data warehousing process overview, data warehousing architecture, data warehouse development, real-time data warehousing, data warehouse administration and security issues, OLTP Vs OLAP .	9	20%
END SEMESTER EXAM			
QUESTION PAPER PATTERN			
<p>There will be two parts in the Question paper - Part A and Part B. Part A will have 8 short answer questions of 3 marks each (8 X 3 M = 24 M). There will be no choice questions. Part B will have 6 essay questions one from each module of 6 marks each, with an alternative choice question from the same module (6 x 6M=36M). The maximum number of sub part questions in Part B to be limited to 2. The total marks assigned to questions in Part A (Short answer) and Part B (Essay) together from a single module will not exceed the marks assigned to that module specified in the course plan.</p>			

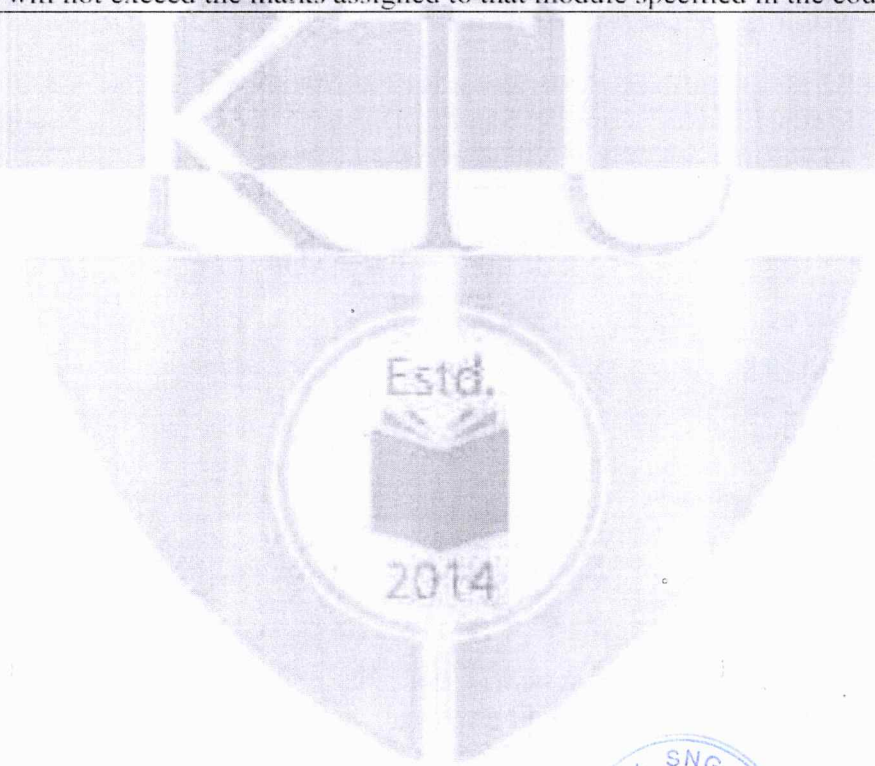
Estd.


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Course code	Course Name	L-T-P - Credits	Year of Introduction
RLMCA274	Business Intelligence and its Applications	3-1-0-4	2016
Course Objectives <ul style="list-style-type: none"> To understand Business Intelligence (BI) systems. To impart knowledge on design of BI solutions for different BI targets and users. To learn the role that software tools/applications play in BI with emphasis on industrial case studies and practical applications 			
Syllabus Decision intelligence, Computerised support, Decision support systems concepts, methodologies and technologies, Modelling analysis, mining for business intelligence, Artificial neural networks for data mining, Text and web mining, Data warehousing			
Expected Outcome The students will be able to <ol style="list-style-type: none"> Differentiate between Transaction Processing and Analytical applications and describe the need for Business Intelligence. Demonstrate understanding of technology and processes associated with Business Intelligence Framework. Select appropriate DM tools and methods to manipulate and achieve data. Demonstrate understanding of Data Warehouse implementation methodology and project life cycle. Identify the metrics, indicators and make recommendations to achieve the business goal for given business scenario. 			
References <ol style="list-style-type: none"> Bert Brijs, Business Analysis for Business Intelligence, CRC press. Efraim Turban, Ramesh Sharda, Dursun Delen, Decision Support Intelligence Systems, 9th edition Pearson Education, 2014. Jiawei Han, Micheline Kamber "Data Mining Concepts and Techniques", Second Edition, Elsevier, Reprinted 2008. 			
Course Plan			
Module	Contents	Hours	Sem. Exam Marks
I	Decision support and business intelligence – introduction, changing business environments, managing decision making, computerized support for decision making, an early framework, work system view, major tools and techniques, plan.	8	10%
II	Computerized decision support – introduction and definitions, models, phases of decision making processes, intelligence phase, design phase, choice phase, implementation phase.	8	10%
FIRST INTERNAL EXAMINATION			
III	Decision support systems concepts, methodologies and technologies – decision support system configurations, description, characteristics and capabilities, classifications, components of decision support systems, data management subsystem, model management subsystem, user interface subsystem, knowledge based management subsystem.	10	20%
IV	Modelling and analysis- management support systems modelling, certainty, uncertainty, risk, decision analysis with decision tables and decision. Data mining for business intelligence- data mining	10	20%

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	concepts and applications, data mining applications, data mining process, data mining methods, data mining software tools.		
V	Artificial neural networks for data mining- basic concepts of neural networks, learning in artificial neural networks. Text and web mining – text mining concepts and definitions, natural language processing, text mining applications, text mining process, text mining tools, web mining overview, web content mining and web structure mining.	9	20%
SECOND INTERNAL EXAMINATION			
VI	Data warehousing – data warehousing concepts and definitions, data warehousing process overview, data warehousing architecture, data warehouse development, real-time data warehousing, data warehouse administration and security issues, OLTP Vs OLAP .	9	20%
END SEMESTER EXAM			
QUESTION PAPER PATTERN			
<p>There will be two parts in the Question paper - Part A and Part B.</p> <p>Part A will have 8 short answer questions of 3 marks each (8 X 3 M = 24 M). There will be no choice questions.</p> <p>Part B will have 6 essay questions one from each module of 6 marks each, with an alternative choice question from the same module (6 x 6M=36M). The maximum number of sub part questions in Part B to be limited to 2.</p> <p>The total marks assigned to questions in Part A (Short answer) and Part B (Essay) together from a single module will not exceed the marks assigned to that module specified in the course plan.</p>			




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20MCA104	ADVANCED COMPUTER NETWORKS	CATEGORY	L	T	P	CREDIT
		GENERAL	3	1	0	4

Preamble: This course intends to provide insight into Advanced Computer Networks. A software professional should have an understanding of layered network architecture. Various kinds of network architectures, issues in integrating networks to modern application development are to be addressed. It is also intended to expose the student to modern technologies such as IPV6 and software defined networks. More detailed treatment can be done through seminars, assignments and talks by eminent external experts.

Prerequisite: Basic concepts of computer operating systems.

Course Outcomes: After the completion of the course the student will be able to

CO 1	Comprehend the terminology and concepts of basic communication model, analyse the protocol layers and design application layer protocols
CO 2	Understand and analyse the various transport layer protocols
CO 3	Compare and contrast various routing algorithms in the network layer.
CO 4	Understand and analyse the concepts of link layer and physical layer.
CO 5	Understand how modern cellular and wireless networks work

Mapping of course outcomes with program outcomes

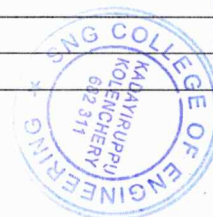
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	3	3	2		2	2	2		3		2	
CO 2	3	3	2		2	2			3		2	
CO 3	3	3			2	2	2		3		2	
CO 4	3	3				2			3		2	
CO 5	3	3				2			3			

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		End Semester Examination
	1	2	
Remember	10	10	10
Understand	20	20	20
Apply	20	20	30
Analyze			
Evaluate			
Create			



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Mark distribution

Total Marks	CIE	ESE	ESE Duration
100	40	60	3 hours

Continuous Internal Evaluation Pattern:

Attendance	: 8 marks
Continuous Assessment Test (2 numbers)	: 20 marks
Assignment/Quiz/Course project	: 12 marks

End Semester Examination Pattern: There will be two parts; Part A and Part B. Part A contains 10 compulsory short answer questions, 2 from each module. Each question carries 3 marks. Part B contains 2 questions from each module of which student should answer any one. Each question can have maximum 2 sub-divisions and carry 6 marks

Course Level Assessment Questions**Course Outcome 1 (CO1):**

1. Explain HTTP request-response behavior with a neat diagram.
2. Compare and contrast OSI and TCP/IP network reference models.
3. Explain the importance of layering in data communication.

Course Outcome 2 (CO2)

1. Explain the process of three-way handshaking in TCP.
2. Compare and contrast Multiplexing and De-multiplexing process in transport layer.
3. Explain How TCP is controlling congestion during data transmission.

Course Outcome 3(CO3):

1. Explain how multicast routing is used in routing protocols.
2. Compare and contrast IPV4 and IPV6.
3. Differentiate virtual circuits and datagram networks.

Course Outcome 4 (CO4):

1. Explain how parity is used to achieve error detection in data communication.
2. Illustrate IEEE 802.3 frame structure.
3. Write short notes on routers, switches and bridges.



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Course Outcome 5 (CO5):

1. List out and explain the various IEEE 802.11 WLAN Components.
2. Explain the architecture of Bluetooth in personal area networks.
3. Explain any six network attacks and their counter measures.

Model Question paper**Part A**

1. Differentiate HTTP persistent and non-persistent communication.
2. List out and explain the functionalities of different DNS records.
3. Compare TCP and UDP at transport layer.
4. Demonstrate how stop-and-wait protocol is used for reliable data transfer.
5. Explain how IPv6 solve the problem of IPv4 exhaustion?
6. Explain how ARP is working in data link layer?
7. A series of 8-bit message blocks to be transmitted across a data link using CRC for error detection. A generator polynomial of $x^3 + x^2 + 1$ is to be used. Message transmitted as 110010. Explain how CRC check is implemented?
8. Classify various wired media used in short and long distance communication.
9. Explain Network Address Translation (NAT).
10. Explain piconet topology of Bluetooth? [3x10=30 Marks]

Part B**Module 1**

11. List and explain ISO/OSI layers and their functions. [6 Marks]
- OR
12. Describe various service models in Quality of Service (QOS). [6 Marks]

Module 2

13. Write a short note on:
 - a. Stop-and-wait [3 Marks]
 - b. Go-back-N [3 Marks]
14. Explain the principles of congestion control with its fairness and efficiency. [6 Marks]



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Module 3

15. Define routing? Explain the process of link state routing with OSPF protocol.
OR [6 Marks]

16. What is Virtual circuit? Explain the connection management in Virtual circuit with suitable diagrams.
[6 Marks]

Module 4

17. Write a short note on:
a. Collision based multiple access protocol [3 Marks]
b. Token based multiple access protocol [3 Marks]
OR

18. Explain IEEE 802.3 Ethernet frame format with its access protocol.
[6 Marks]

Module 5

19. What is Bluetooth? Explain the various layers of Bluetooth with a neat diagram.
[6 Marks]
OR

20. Write a short note on:
a. Traffic analysis tools [3 Marks]
b. Troubleshooting [3 Marks]

Syllabus

Module	Contents	Hours
I	Overview of Computer Networks and the Internet. History. Protocols, Review of last mile technologies used for internet access. Packet switching. Basic ideas about delay queuing throughput. Concept of Quality of Service, Protocol layering. OSI model and TCP model Application layer protocols - Client-server architecture Network layer 7 application architecture, Web, HTTP, FTP, SMTP, POP3, and DNS, Peer-to-peer file sharing networks	10



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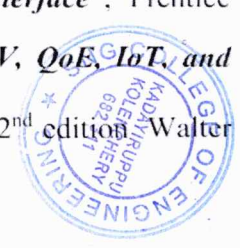
Module	Contents	Hours
II	Transport Layer Protocols: Introduction to transport layer, Multiplexing and de-multiplexing, Principles of Reliable data transfer - Stop-and-wait and Go-back- N design and evaluation, Connection oriented transport TCP, Connectionless transport UDP, Principles of congestion control -efficiency and fairness	10
III	Network Layer Protocols: Virtual circuits and datagrams, Principles of routing, internet protocol Ipv4 CIDR Routing algorithms: Link-state and distance vector routing, Routing on the internet RIP OSPF and BGP, Multicast routing. Introduction to IPV6 and software defined networks, Open flow	10
IV	Link layer and Physical Layer: Introduction to link layer - Error detection (parity, checksum, and CRC), Multiple access protocols (collision and token based), IEEE 802.3 Ethernet, Switching and bridging, Media, Signal strength and interference. Data encoding, Ethernet switches , Routers MAC, ARP, FIB	8
V	IEEE 802.11 Wi-Fi, Bluetooth, and cellular networks,Threats and attacks, Network Address Translation , Firewalls, VPNs, Introduction to network management, SNMP, Overview of tools and troubleshooting, Traffic analysis tools and Configuration management.	10

Textbooks:

1. Behrouz A Forouzan, Firouz Mosharraf, "*Computer Networks: A top down Approach*", McGraw Hill Education, 1 st Edition (2011).
2. James F Kurose and Keith W Ross, "*Computer Networking: A Top - Down Approach*", Pearson Education; 6 th Edition (2017).

Reference Books:

1. Kevin R. Fall, W. Richard Stevens, "*TCP/IP Illustrated, Volume 1 -The Protocols*", Pearson Education, 2 nd Edition (2014).
2. Larry Peterson, Bruce Davie, "*Computer Networks, A systems Approach*", Morgan Kaufmann Publishers, 5th Edition (2011).
3. Uyles Black, "*Computer Networks: Protocols, Standards and Interface*", Prentice Hall India Learning Private Limited, 8 th Edition (2015).
4. William Stallings, "*Foundations of Modern Networking: SDN, NFV, QoE, IoT, and Cloud*", Pearson Education, 1 st Edition (2016)
5. *The Illustrated Network: How TCP/IP Works in a Modern Network* 2nd edition Walter Goralski Morgan Kaufmann Publications



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20MCA182	BUSINESS MANAGEMENT	CATEGORY	L	T	P	CREDIT
		ELECTIVE	3	1	0	4

Preamble: The primary aim of this course is to understand basic principles of management and accounting. In our day to day life managers will have to manage so many resources in the present day complex business environment. By effective and efficient management the goals of the organisation can be attained. This course is intended to give an idea regarding managing the resources for the effective performance of the organisation and decision making in everyday life. Basic idea regarding book keeping and accounting is also required for managers for taking decisions.

Prerequisite: NIL

Course Outcomes: After the completion of the course the student will be able to

CO 1	Understand management as a process.
CO 2	Critically analyse and evaluate management theories and practices
CO 3	Perform planning and organising for an organisation
CO 4	Do staffing and related human resource development function
CO 5	Take proper decisions to get competitive advantage
CO 6	Understand basic concepts in book keeping and accounting.

Course Outcomes: After the completion of the course the student will be able to

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	3							2				
CO 2		3										
CO 3			3									3
CO 4											3	
CO 5					3	2						
CO 6	3							3				

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		End Semester Examination
	1	2	
Remember	10	10	20
Understand	20	20	20
Apply	20	20	20
Analyse			
Evaluate			



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Create			
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Mark distribution

Total Marks	CIE	ESE	ESE Duration
100	40	60	3 hours

Continuous Internal Evaluation Pattern:

Attendance	: 8 marks
Continuous Assessment Test (2 numbers)	: 20 marks
Assignment/Quiz/Course project	: 12 marks

End Semester Examination Pattern: There will be two parts; Part A and Part B. Part A contain 10 questions with 2 questions from each module, having 3 marks for each question. Students should answer all questions. Part B contains 2 questions from each module of which student should answer any one. Each question can have maximum 2 sub-divisions and carry 6 marks.

Course Level Assessment Sample Questions**Course Outcome CO1:**

Describe various functions of management.

Course Outcome CO2 :

Explain different theories of management thought.

Course Outcome CO3:

Illustrate different steps in planning.

Course Outcome CO4:

Describe different types of training methods for employees in an organisation.

Course Outcome CO5:

Explain the decision process in an organisation with case example.

Course Outcome CO6:

Explain the procedure of preparation of balance sheet with a simple example.




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Model Question Paper

			Total Pages:
Reg No.:		Name:	
APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY			
SECOND SEMESTER M.C.A. DEGREE EXAMINATION			
Course Code: 20MCA182			
Course Name: BUSINESS MANAGEMENT			
Max. Marks: 60		Duration: 3 Hours	
PART A			
<i>Answer all questions, each carries 3 marks.</i>			Marks
1	Define management. What are the levels of management?		(3)
2	Distinguish between efficiency and effectiveness in management		(3)
3	Explain system approach in management.		(3)
4	Illustrate different types of plans		(3)
5	Explain matrix form of organisation.		(3)
6	What is meant by job analysis?		(3)
7	Explain bench marking		(3)
8	What is product life cycle?		(3)
9	Explain the rules of debit and credit.		(3)
10	Explain the advantages of accounting softwares.		(3)
PART B			
<i>Answer six questions, one full question from each module and carries 6 marks.</i>			
Module I			
11	What are the different roles that managers play in an organisation?		(6)
OR			
12	Explain the major contributions of F W Taylor to scientific management		(6)
Module II			
13	Explain various steps involved in planning with a case example.		(6)
OR			
14	Explain any 3 types of organisation structures.		(6)




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Module III		
15	Explain various steps involved in selection of employees for an organisation.	(6)
OR		
16	Describe different types of training methods for employees in an organisation	(6)
Module IV		
17	Illustrate the decision process in an industry by giving different steps involved in it.	(6)
OR		
18	Explain the marketing mix elements with a case example.	(6)
Module V		
19	What is a Journal? Explain the rules of journalising	(6)
OR		
20	What are final accounts? Explain the procedure of preparing balance sheet with a simple example.	(6)

Syllabus

Module I

Introduction to Management: Basic Managerial Concepts, Levels of management, Managerial Skills, Managerial role. Management functions- Planning, Organising, Staffing, leading and Controlling.

Early Contributions in Management: Management thought - Classical approach, scientific management, contributions of Taylor, Gilbreths, Fayol's 14 principles of management.

Human relation approach - contribution of Elton Mayo Systems approach - organization as an open system and Contingency approach

Module II

Planning: Nature and importance of planning, types of plans - Steps in planning, Levels of planning - The Planning Process - MBO definition and process, SWOT Analysis, importance.

Organising: Nature of organizing,-span of control in management, factors affecting span of control- Authority and responsibility.

Organisation structure - Formal and informal, Types of organization structure line, line and staff, functional, divisional, project, matrix, virtual form of organisations.

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Module III

Staffing and related HRD Functions: meaning, nature, staffing process, Job analysis and manpower planning, job description and job specification, Recruitment & selection, selection process, Tests and interviews. Training and development - concept and methods ,Performance appraisal- concept and methods.

Module IV

Managerial Decision Making and controlling : Decision making –types of decisions, decision making process, Decision Making Tools, Importance of controlling, Techniques of controlling- Break Even Analysis, Budgetary Control - Benchmarking –importance and limitations of benchmarking, Six Sigma importance, limitations and process of six sigma, Total Quality Management- Introduction to marketing management-Marketing mix- product life cycle

Module V

Book- Keeping and Accountancy -Elements of Double Entry -Book- Keeping - rules for journalizing -Ledger accounts –Cash book- – Trial Balance- Method of Balancing accounts- the journal proper (simple problems). Final accounts: Preparation of trading and profit and loss Account- Balance sheet (with simple problems) - Introduction to Accounting packages (Description only)

References

1. L M Prasad, "*Principles of Management*", Sultan Chand & Sons, 8th Edition (2010)
2. Peter F Drucker, "*The Practice of Management*", Butterworth-Heinemann publication, 2nd Edition (2007)
3. Harold Koontz and Heinz Weihrich, "*Essentials of Management*", McGraw Hill Education, 10th Edition (2015).
4. Robbins and Coulter, *Management*, Pearson Education 13th Edition, 2016.
5. R N Gupta, "*Principles of Management*", S. Chand & Company Ltd., (2010)
6. Tripathi, "*Principles of Management*", McGraw Hill Education, 5th Edition (2012)
7. *Double Entry book Keeping* – Batliboi
8. *A Systematic approach to Accounting*: Dr K.G. Chandrasekharan Nair

Suggested MOOCs

1. Management Functions <http://nptel.ac.in/courses/122108038/>
2. Leadership <http://nptel.ac.in/courses/110105033/33>



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CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT
20MCA263	CYBER SECURITY & CRYPTOGRAPHY	ELECTIVE	3	1	0	4

Preamble: This course is designed to provide theoretical concepts used in cryptography and to introduce the students to various cryptographic algorithms and techniques used for implementing data security and protection. This course also discusses common web application security vulnerabilities.

Prerequisite: Student is expected to have studied mathematics courses that cover Elementary Number Theory, Finite Field, Discrete Logarithm and Euclidean Algorithm.

Course Outcomes: After completion of the course the student will be able to

CO No.	Course Outcome (CO)	Bloom's Category Level
CO 1	Explain various types of security attacks, security mechanisms, security services and classical encryption techniques.	Level 2: Understand
CO 2	Make use of Symmetric and Asymmetric encryption techniques to solve cryptographic problems.	Level 3: Apply
CO 3	Describe the concepts of message authentication codes, hash functions and digital signing techniques for ensuring secure transactions.	Level 2: Understand
CO 4	Discuss security services in Application, Transport and Network layers.	Level 2: Understand
CO 5	Explain common web application security vulnerabilities and various prevention mechanisms.	Level 2: Understand

Mapping of Course Outcomes with Program Outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	2	1	1				1					
CO 2	2	2	2	1			1					
CO 3	2	1	1				1					
CO 4	2	1	1			2	1					
CO 5	2	1	1			2	1					

3/2/1: High/Medium/Low

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Assessment Pattern

Bloom's Category Levels	Continuous Assessment Tests		End Semester Examination
	1	2	
Level 1: Remember	15	15	20
Level 2: Understand	35	35	40
Level 3: Apply			
Level 4: Analyse			
Level 5: Evaluate			
Level 6: Create			

Mark distribution

Total Marks	Continuous Internal Evaluation (CIE)	End Semester Examination (ESE)	ESE Duration
100	40	60	3 hours

Continuous Internal Evaluation Pattern:

Attendance	: 8 marks
Continuous Assessment Test (2 numbers)	: 20 marks
Assignment/Quiz/Course project	: 12 marks

End Semester Examination Pattern: There will be two parts; Part A and Part B. Part A contains 10 compulsory short answer questions, 2 from each module. Each question carries 3 marks. Part B contains 2 questions from each module of which student should answer any one. Each question can have a maximum of 2 sub-divisions and carry 6 marks.

Sample Course Level Assessment Questions**Course Outcome 1 (CO 1):**

1. Briefly explain each component of OSI security architecture.
2. Compare Substitution and Transposition techniques in cryptography.
3. Explain how steganography is used in cryptography.

Course Outcome 2 (CO 2):

1. Explain block cipher modes of operation.
2. Compare DES and AES

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3. Perform encryption and decryption using RSA Algorithm with parameters: $P=17$, $q = 11$, $e = 7$, $M = 88$.

Course Outcome 3 (CO 3):

1. Compare the features of HMAC and CMAC algorithms.
2. Explain important steps in DSS.
3. Describe the terms (a) birthday attack (b) hashcash (c) blind signature

Course Outcome 4 (CO 4):

1. Explain any one protocol used in E-mail for security.
2. Explain how security is provided in Network Layer using IPsec.
3. Describe the process of securing electronic transactions.

Course Outcome 5 (CO 5):

1. Discuss any four Application Security Risks.
2. Which are the different forms of XSS and how to prevent these?
3. Explain the attack scenario of any four web application security vulnerabilities.

Model Question Paper

Course Code: 20MCA263

Course Name: CYBER SECURITY & CRYPTOGRAPHY

Max. Marks :60

Duration: 3 Hrs

Part A

Answer all questions.

Each question carries 3 marks (10 x 3 = 30 Marks)

1. Compare phishing and ransomware attacks.
2. What is OSI security architecture?
3. List out the advantages and disadvantages of Output Feed Back mode.
4. Explain round functions used in DES.
5. Explain important steps in DSS.
6. Describe the terms (a) birthday attack (b) hashcash (c) blind signature.
7. Describe security association of IPsec.
8. Explain about S/MIME.



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9. How can we prevent Injection attack?
 10. What is XXE? How to prevent it?

(10 x 3=30 marks)

Part B

*Answer all questions. Each question carries 6 marks. (5 * 6 = 30 Marks)*

11. Explain Network security model with the help of a neat diagram (6)

OR

12. Describe the working of Playfair cipher and Hill cipher. (6)

13. Apply Diffie-Hellman key exchange algorithm to compute the shared private key using the values $P = 23$, $g = 9$, $a = 4$, $b = 3$. Explain the steps in detail. (6)

OR

14. Perform encryption and decryption using RSA Algorithm with parameters: $P=17$, $q = 11$, $e = 7$, $M = 88$. Explain the steps in detail. (6)

15. Compare HMAC and CMAC protocol with suitable diagrams. (6)

OR

16. Compare various signature schemes with suitable diagrams. (6)

17. Explain PGP cryptographic functions with diagram. (6)

OR

18. Explain Secure Electronic Transaction Protocol. (6)

19. Briefly explain any four Application Security Risks. (6)

OR

20. Explain the attack scenarios of any four web application security vulnerabilities. (6)

(5 x 6=30 Marks)

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Syllabus

Module 1: (7 Hours)
Introduction to Cryptography, OSI security architecture: Security Services, Mechanisms and attacks- Phishing, Ransomware, DoS attack. Network security model. Classical Encryption techniques - Symmetric cipher model, substitution techniques, transposition techniques. Steganography.
Module 2: (10 Hours)
Conventional Symmetric Key Encryption: Block ciphers and Stream Ciphers, Block Cipher Design Principles, Modes of operation, Data Encryption Standard, Advanced Encryption Standard (AES), Multiple Encryption, Triple DES. Public key cryptography: Principles of public key cryptosystems-The RSA algorithm-Key management – Diffie Hellman Key exchange - Elliptic curve arithmetic - Elliptic curve cryptography.
Module 3: (10 Hours)
Hash Functions and MAC: Properties of hash functions, birthday attack, hashcash, Message Authentication Code Algorithms, MAC protocols: HMAC, CMAC. Digital Signatures: Classification of signature schemes: RSA signature, Digital Signature Standard, Overview of ElGamal and Schnorr schemes, One time signature schemes, Attacks on Digital Signatures, Blind Signatures.
Module 4: (10 Hours)
Introduction to Cyber Security: Email Security: Security Services email, Attacks possible through email, Establishing keys privacy, authentication of the Integrity, Non-repudiation, Pretty Good Privacy, S/MIME. IP Security: Overview of IPsec, IPv4 and IPv6, Authentication Header, Encapsulation Security Payload (ESP), Internet Key Exchange. Transport Level Security: SSL/TLS Basic Protocol, computing the keys, client authentication, PKI as deployed by SSL, Attacks fixed in v3, Exportability, Encoding, Secure Electronic Transaction (SET).
Module 5: (8 Hours)
Common web application security vulnerabilities: Injection flaws, Broken authentication, Sensitive data exposure, XML External Entities (XXE), Broken access control, Security misconfiguration, Cross-Site Scripting (XSS), Insecure deserialization, Using components with known vulnerabilities, Insufficient logging & monitoring. Example attack scenarios of each of the vulnerabilities listed; how to prevent them

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Text Book

1. William Stallings, "Cryptography and Network Security," 6th Edition, Pearson Education, March (2013).
2. Behrouz A. Forouzan, "Introduction to Cryptography and Network Security", Tata McGraw-Hill Publishing 2nd Edition (2011).

Reference Books

1. Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security", Prentice Hall of India, 2002.
2. Manuel Mogollon. "Cryptography and Security Services – Mechanisms and Applications", Cybertech Publishing, 2008
3. William R. Cheswick, Steven M. Bellovin, Aviel D. Rubin, "Firewalls and Internet Security" Addison- Wesley, 2003

Web References

1. <http://www.hashcash.org/hashcash.pdf> [Reference for hashcash]
2. https://owasp.org/www-pdf-archive/OWASP_Top_10-2017_%28en%29.pdf. [Reference for Module 5]
3. <https://www.coursera.org/learn/crypto>
4. <https://www.coursera.org/learn/crypto2>

Course Contents and Lecture Schedule

Sl. No.		No. of Lectures
1	Introduction to Cryptography	7 Hours
1.1	What is cryptography, Related Terms, Need of cryptosystems	1
1.2	OSI security architecture: Security Services, Mechanisms	1
1.3	Security attacks- Phishing, Ransomware, DoS attack.	1
1.4	Network security model	1
1.5	Classical Encryption techniques, Symmetric cipher model	1
1.6	Substitution techniques	1
1.7	Transposition techniques, Steganography	1
2	Conventional Symmetric and Public Key Encryption	10 Hours
2.1	Block ciphers and Stream Ciphers, Block Cipher Design Principles	1
2.2	Modes of operation	1
2.3	Data Encryption Standard	1
2.4	Advanced Encryption Standard (AES)	1
2.5	Multiple Encryption, Triple DES	1
2.6	Public key cryptography: Principles of public key cryptosystems	1
2.7	The RSA algorithm	1

2.8	Key management	1
2.9	Diffie Hellman Key exchange	1
2.10	Elliptic curve arithmetic - Elliptic curve cryptography.	1
3	Hash Functions and MAC	10 Hours
3.1	Properties of hash functions, birthday attack	1
3.2	Hashcash, Message Authentication Code Algorithms	1
3.3	MAC protocols: HMAC, CMAC	1
3.4	Digital Signatures: Classification of signature schemes	1
3.5	RSA signature	1
3.6	Digital Signature Standard	1
3.7	Overview of ElGamal and Schnorr schemes	1
3.8		1
3.9	Attacks on Digital Signatures	1
3.10	Blind Signatures	1
4	Introduction to Cyber Security	10 Hours
4.1	Email Security: Security Services for email, Attacks possible through email	1
4.2	Establishing keys privacy, authentication of the source, Message Integrity, Non-repudiation	1
4.3	Pretty Good Privacy, S/MIME	1
4.4	IP Security: Overview of IPsec	1
4.5	IPv4 and IPv6, Authentication Header	1
4.6	Encapsulation Security Payload (ESP), Internet Key Exchange	1
4.7	Transport Level Security: SSL/TLS Basic Protocol	1
4.8	computing the keys, client authentication, PKI as deployed by SSL	1
4.9	Attacks fixed in v3, Exportability, Encoding	1
4.10	Secure Electronic Transaction (SET)	1
5	Common web application security vulnerabilities	8 Hours
5.1	Common web application security vulnerabilities	1
5.2	Injection flaws, Broken authentication	1
5.3	Sensitive data exposure, XML External Entities (XXE)	1
5.4	Broken access control, Security misconfiguration	1
5.5	Cross-Site Scripting (XSS), Insecure deserialization	1
5.6	Using components with known vulnerabilities, Insufficient logging & monitoring.	1
5.7	Example attack scenarios of each of the vulnerabilities listed	1
5.8	How to prevent each of the vulnerabilities.	1

CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT
20MCA267	CYBER FORENSICS	ELECTIVE	3	1	0	4

Preamble: This course helps the learner to understand the fundamentals of cyber forensics. Student will learn common approaches, practices and techniques used for collecting and preserving digital evidences in this course.

Prerequisite: Basic knowledge in operating systems & computer networks.

Course Outcomes: After completion of the course the student will be able to

CO No.		Bloom's Category Level
CO 1	Explain a computer crime and the concept of rules or policy violations.	Level 2: Understand
CO 2	Gather evidences and preserve the collected evidence with the required knowledge on various storage format choices.	Level 3; Apply
CO 3	Describe digital storage and file systems and extract data using Autopsy.	Level 3; Apply
CO 4	Explain mobile and practice data acquisition procedures for network forensics using Wireshark.	Level 3; Apply
CO 5	Prepare forensics reports both using tools and manually and explain ethics and code for expert witness.	Level 2: Understand

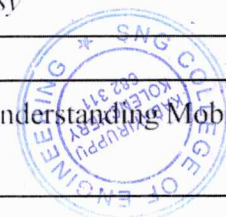
Mapping of Course Outcomes with Program Outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	2					2			2			
CO 2	2				2							
CO 3	2				2							
CO 4	2				2							
CO 5	2				2	3						

3/2/1: High/Medium/Low

Syllabus

<p>Module 1: (8 Hours)</p> <p>Overview of computer crime, Overview of company policy violation, Preparing a case - Planning an investigation, Securing evidence. Industrial espionage investigation.</p> <p>Conducting an investigation: Gathering evidence, Bit-stream copy of evidence.</p> <p>Storage formats for storing collected digital evidence - Raw format, Proprietary formats, Advanced Forensic Format (AFF). Acquisition tools and methods. Digital evidence validation methods and tools.</p> <p>Storing Digital evidence- Evidence Retention.</p> <p>Familiarizing Autopsy for Windows - a free forensics tool.</p>
<p>Understanding Digital data and storage systems: Understanding boot sequence. Understanding Disk Drives - Solid-state Storage Devices (SSDs).</p> <p>Microsoft File Systems - Disk partitions, Understanding FAT. Understanding NTFS, MFT file attributes, file data, NTFS compressed files, NTFS encrypted file system, Deleting NTFS file system, ReFS.</p> <p>Whole disk encryption, Microsoft BitLocker. Understanding Windows Registry. Microsoft Windows startup tasks.</p> <p><i>A practical assignment may be given in encrypting a partition of your computer hard disk drive/ encrypting USB flash drive to avoid firm-level attack.</i></p>
<p>Module 3: (10 Hours)</p> <p>Linux file structures - File structures in Ext4, Hard links and Symbolic links.</p> <p>Macintosh (MacOS) file structures - Forensic procedures in MacOS.</p> <p>Setting up Sleuth Kit and Autopsy - Examining a case with Sleuth Kit and Autopsy, Importance of Write-blocker.</p> <p>Acquiring data with a Linux boot CD - Preparing a target drive for data acquisition, Using dd and dcfldd commands.</p> <p>Validating data acquisitions - Linux validation methods, Windows validation methods.</p> <p>Following practical assignments may be given:</p> <ol style="list-style-type: none"> i. Recover deleted files from pen drive ii. Extract camera information from recovered images iii. Extract deleted internet browsing history iv. Recover deleted files from unallocated space using Autopsy
<p>Module 4: (10 Hours)</p> <p>Understanding Mobile Device forensics - Mobile phone basics, Understanding Mobile phone hardware</p>



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8. List different types of mobile forensic acquisition procedures.
9. State the guidelines for writing a report which is admissible in a court of law.
10. What are the different types of forensics reports?

(10 x 3=30 marks)

Part B

*Answer all questions. Each question carries 6 marks. (5 * 6 = 30 Marks)*

11. What is evidence bag? Describe standard operating procedures for securing evidence before transporting it to forensic lab. (6)

OR

12. How the retention policy of evidence related to evidence storage mediums? (6)

13. Explain the importance of Windows Registry in forensics analysis. (6)

OR

14. What is a solid-state storage device? Discuss the usage of Microsoft BitLocker tool. (6)

15. Explain the file structures of Linux and MacOS. (6)

OR

16. Define write blocker? Explain the use of Sleuth Kit tool. (6)

17. Explain the standard operating procedures used for mobile forensics. (6)

OR

18. Discuss the standard operating procedures used for network forensics. (6)

19. List and explain the steps involved in generating forensics report using Autopsy tool. (6)

OR

20. What are the responsibilities of a Computer Forensic Investigator? (6)

(5 x 6=30 Marks)

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Acquisition procedures for Mobile devices, Mobile Forensic equipment, SIM card readers, Mobile phone Forensics tools and methods.

Network Forensics - The Need for Established Procedures, Securing a Network, Developing Procedures for Network Forensics, Wireshark packet analyser.

Practical assignments may be given:

- i. Identify students who use college lab facility to browse shopping websites
- ii. Identify the hacking attempt on a closed port using ping sweep
- iii. Using Wireshark retrieve the username and password of users who browse less secure website with Wi-Fi connection

Module 5: (7 Hours)

Understand the importance of Forensics Reports, Types of reports, Guidelines for writing reports, Layout and presentation of reports, Generating reports with Autopsy.

Ethics and codes for Expert Witness - Forensics Examiner's role in testifying, Considerations in disqualification, Determining admissibility of evidence. Ethical difficulties in Expert Testimony, Ethical responsibilities.

Text Book

1. Bill Nelson, Amelia Phillips, Christopher Steuart, "Guide to Computer Forensics and Investigations", Cengage Learning, 6th Edition.

Reference Books

1. Marjie T. Britz, "Computer Forensics and Cyber Crime", Pearson Third Edition 2013.
2. Marie - Helen Maras "Computer Forensics: Cybercriminals, Laws, and Evidence", Jones & Bartlett Learning, Second Edition 2015.

Web References

1. <https://www.wireshark.org/download/docs/user-guide.pdf> (Reference for Wireshark)
2. <http://www.open.edu/openlearn/futurelearn/cyber-security>

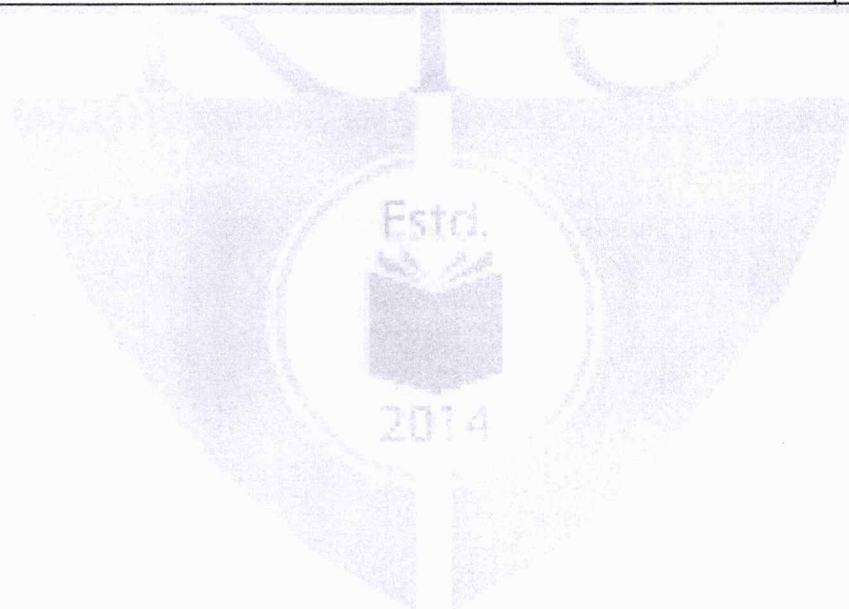


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Course Contents and Lecture Schedule

Sl. No.	Topic	No. of Lectures
1	Module 1	8 Hours
1.1	An overview of computer crimes and company policy violations	1
1.2	Preparing a case - Planning an investigation, Securing evidence. Industrial espionage investigation	1
1.3	Conducting an investigation: Gathering evidence, Bit-stream copy of evidence	1
1.4		1
1.5	Acquisition tools and methods	1
1.6	Digital evidence validation methods and tools	1
1.7	Storing Digital evidence -Evidence Retention	1
1.8	Familiarizing Autopsy for Windows - a free forensics tool	1
2	Module 2	10 Hours
2.1	Understanding Digital data and storage systems, Understanding boot sequence	1
2.2	Understanding Disk Drives	1
2.3	Solid-state Storage Devices (SSDs)	1
2.4	Microsoft File Systems - Disk partitions	1
2.5	Understanding FAT	1
2.6	Understanding NTFS, MFT - file attributes, file data	1
2.7	NTFS compressed files, NTFS encrypted file system	1
2.8	Deleting NTFS file system, ReFS	1
2.9	Whole disk encryption, Microsoft BitLocker	1
2.10	Understanding Windows Registry, Microsoft Windows startup tasks	1
3	Module 3	10 Hours
3.1	Linux file structures - File structures in Ext4	1
3.2	Hard links and Symbolic links	1
3.3	Macintosh (MacOS) file structures - Forensic procedures in MacOS	1
3.4	Setting up Sleuth Kit and Autopsy - Examining a case with Sleuth Kit and Autopsy	1
3.5	Importance of Write-blocker	1

3.6	Acquiring data with a Linux boot CD	1
3.7	Preparing a target drive for data acquisition	1
3.8	Using dd and defldd commands	1
3.9	Validating data acquisitions - Linux validation methods	1
3.10	Windows validation methods	1
4	Module 4	10 Hours
4.1	Understanding Mobile Device forensics - Mobile phone basics	1
4.2	Understanding Mobile phone hardware	1
4.3	Acquisition procedures for Mobile devices	1
4.4	Mobile Forensic equipment	1
4.5	SIM card readers	1
4.6		1
4.7	Network Forensics - The Need for Established Procedures	1
4.8	Securing a Network	1
4.9	Developing Procedures for Network Forensics	1
4.10	Wireshark packet analyser	1
5	Module 5	7 Hours
5.1	Understand the importance of Forensics Reports, Types of reports	1
5.2	Guidelines for writing reports, Layout and presentation of reports	1
5.3	Generating reports with Autopsy	1
5.4	Ethics and codes for Expert Witness - Forensics Examiner's role in testifying	1
5.5	Considerations in disqualification, Determining admissibility of evidence	1
5.6	Ethical difficulties in Expert Testimony	1
5.7	Ethical responsibilities	1



20MCA192	IPR AND CYBER LAWS	CATEGORY	L	T	P	CREDIT
		ELECTIVE	3	1	0	4

Preamble: This course intends to provide insight into Intellectual Property Rights and Cyber Laws. It includes detailed discussion on various intellectual property rights, procedures to apply for copyrights & patents, legalities of intellectual property to avoid plagiarism and other IPR related crimes. Effectiveness of cyber-laws and other countermeasures against cybercrime and cyber warfare are discussed in detail. Various kinds of Intellectual Property issues in cyberspace and the growth and development of the law in this regard are included to the level possible within the scope of a single course. More detailed treatment can be done through seminars, assignments and talks by eminent external experts including industry.

Prerequisite: General awareness on internet essentials, web technologies, e-commerce.

Course Outcomes: After the completion of the course the student will be able to

CO 1	Explain the fundamentals of IPR and patents.
CO 2	Apply intellectual property related tools such as trademark and copyright to real problems.
CO 3	Discuss Industrial designs, trade secret and geographic Indications.
CO 4	Describe laws governing cyberspace and analyze the role of Internet Governance in framing policies for Internet security.
CO 5	Discuss different types of cybercrimes and penalties under IT Act.

Mapping of course outcomes with program outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	3	2	2	1		1						
CO 2	3	3	2	1		1						
CO 3	3	2	1	1								
CO 4	2	2	1			1						
CO 5	2	2	1	1		1						

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		End Semester Examination
	1	2	
Remember	10	10	10
Understand	20	30	25
Apply	20	10	25
Analyse			
Evaluate			
Create			



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3.6	Acquiring data with a Linux boot CD	1
3.7	Preparing a target drive for data acquisition	1
3.8	Using dd and defldd commands	1
3.9	Validating data acquisitions - Linux validation methods	1
3.10	Windows validation methods	1
4	Module 4	10 Hours
4.1	Understanding Mobile Device forensics - Mobile phone basics	1
4.2	Understanding Mobile phone hardware	1
4.3	Acquisition procedures for Mobile devices	1
4.4	Mobile Forensic equipment	1
4.5	SIM card readers	1
4.6		1
4.7	Network Forensics - The Need for Established Procedures	1
4.8	Securing a Network	1
4.9	Developing Procedures for Network Forensics	1
4.10	Wireshark packet analyser	1
5	Module 5	7 Hours
5.1	Understand the importance of Forensics Reports, Types of reports	1
5.2	Guidelines for writing reports, Layout and presentation of reports	1
5.3	Generating reports with Autopsy	1
5.4	Ethics and codes for Expert Witness - Forensics Examiner's role in testifying	1
5.5	Considerations in disqualification, Determining admissibility of evidence	1
5.6	Ethical difficulties in Expert Testimony	1
5.7	Ethical responsibilities	1

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Mark distribution

Total Marks	CIE	ESE	ESE Duration
100	40	60	3 hours

Continuous Internal Evaluation Pattern:

Attendance	: 8 marks
Continuous Assessment Test (2 numbers)	: 20 marks
Assignment/Quiz/Course project	: 12 marks

End Semester Examination Pattern: There will be two parts; Part A and Part B. Part A contains 10 compulsory short answer questions, 2 from each module. Each question carries 3 marks. Part B contains 2 questions from each module of which student should answer any one. Each question can have maximum 2 sub-divisions and carry 6 marks

Course Level Assessment Questions**Course Outcome 1 (CO1):**

4. Discuss the need for protection of intellectual property.
5. Explain TRIPS Agreement.
6. Illustrate types of patent applications.

Course Outcome 2 (CO2)

4. Explain Trademark Infringement and Protection of trademarks.
5. Explain the rights conferred by copyright, registration and ownerships of copyrights.
6. Discuss about software copyright.

Course Outcome 3(CO3):

4. Discuss the need for protection of design and explain Design Act, 2000.
5. Explain basic concepts of Geographic Indications such as filing, granting and Protection of geographic indications.
6. Describe the procedure of discovering and protecting of trade secret.

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Course Outcome 4 (CO4):

4. Explain the need for cyber laws.
5. Discuss protection of copyright on cyberspace.
6. Explain ISP in cyberspace.

Course Outcome 5 (CO5):

4. Explain different amendments on IT Act 2000.
5. Discuss Terrorism on cyberspace.
6. Explain offences of misrepresentation.

Model Question paper**Part A**

21. Categorize various patent applications.
22. Explain the criteria for categorizing an invention as patentable or non-patentable.
23. What are the requirements for filing trademarks?
24. Explain copyright and the rights conferred by copyrights.
25. Explain the term geographical indications by giving suitable examples.
26. What is meant by design under the Design Act,2000?
27. Describe the risks associated with cyber space.
28. What is meant by the term cyber laws.
29. Explain cyber stalking and phishing.
30. Define the term hacking and explain its essentials. [3 x 10 =30 Marks]

Part B**Module 1**

31. Describe the procedure for registration of patents. [6 Marks]
- OR
32. Write short notes on
 - c. Intellectual property and the need for its protection. [3 marks]
 - d. Importance and features of WIPO. [3 marks]

Module 2

33. Explain the methods for transferring copyrights. [6 Marks]
- OR
34. Describe software copyright and how can software be classified according to copyrights. [6 Marks]



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Module 3

35. What is industrial design? Describe the salient features of Design act, 2000. [6 Marks]

OR

36. How are the trade secrets dealt with under the Indian law? Discuss. [6 Marks]

Module 4

37. Explain the essential requirements of cyber squatting. [6 Marks]

OR

38. Discuss about cyber space and the protection of copyrights on cyberspace. [6 Marks]

Module 5

39. Explain the objectives and features of Information Technology Act 2000. [6 Marks]

OR

40. What do you mean by cyber crimes? Discuss the nature and types of cyber crimes. [6 Marks]

Syllabus

Module	Contents	Hours
I	Fundamentals of IPR- Introduction – Intellectual property – Need protection of intellectual property – WIPO – Intellectual property rights TRIPS Agreement - Patents – Rationale of protection – Non-patentable Invention – Types of patent applications Introduction – Patentable and Guidelines for registration of patent – patent filing – grant of patent – types of patent documents.	10

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Module	Contents	Hours
II	Trademarks – Guidelines for registration- Requirements for filing trademarks – Trademark Infringement – Protection of trademarks – Copyright – Introduction – Rights conferred by copyright – registration – ownerships – terms – transfer of copyrights – copyright infringement – databases and copyright- Software Copyright –Introduction – Need of software copyright – classification of software according to copyright – software auditing –copyright notice – transfer of copyright.	10
III	Industrial Designs – Introduction – Need for protection of design – requirements for registration of designs – Design Act,2000 – Duration of registration of design – application procedure – Geographic Indications –Introduction – Filing – Granting – Protection of geographic indications. Trade Secret – definition – discovering and protecting of trade secret.	10
IV	Cyber law - Need for cyber laws - Historical perspective - cyberspace - deception by squatting in cyberspace - protection of copyright on cyberspace - infringement of copyright on cyberspace - linking,hyperlinking and framing - ISP in cyberspace - cyberspace and protection of patents in India.	8
V	Information Technology Act and Punishments - Introduction to IT Act 2000- Amendments on IT Act - Violation of the right of privacy in cyberspace/internet-punishment for violation of privacy, breach of confidentiality and privacy under IT act-Terrorism on cyberspace Overview of cybercrimes-offences by intermediaries- offences related to protected system- offences of misrepresentation-punishment for Abetment and Attempt to commit offences under the IT act.	10

Textbooks:

1. Dr. R. Radhakrishnan and Dr. S. Balasubramanian, “**Intellectual Property Rights: Text and Cases**”, Excel Books
2. Harish Chander, “**Cyber Law and IT Protection**”, PHI Learning Pvt.Ltd.

Reference Books:

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20MCA164	ORGANIZATIONAL BEHAVIOUR	CATEGORY	L	T	P	CREDIT
		ELECTIVE	3	1	0	4

Preamble: This course is designed primarily for students who are being exposed to Organizational Behaviour for the first time. Primary aim of this course is to help students to understand the organizational culture and its dynamics and to acquire skills to take rational decisions in groups or organizations.

Prerequisite: Nil

Course Outcomes: After the completion of the course the student will be able to

CO 1	Identify managers' challenges and opportunities in applying OB concepts.
CO 2	Analyse various characteristics of individual behaviour and its impact on organizational performance.
CO 3	Acquire knowledge about the complexities associated with management of individual behaviour in the organization.
CO 4	Understand group behaviour and develop inter-personal skills and group dynamics.
CO 5	Understand organizational structures and analyze the behavioral implications of different organizational designs.

Mapping of course outcomes with program outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	2	2	1			2		2	2		1	1
CO 2	2	2				1	2	3	3		3	1
CO 3	2	2				1	2	3	3		3	1
CO 4	2	2				1		3	3		3	
CO 5	2	2	1					2	2		1	

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Assessment Pattern

Bloom's Category	Continuous Assessment Tests		End Semester Examination
	1	2	
Remember(K1)	30%	30%	30%
Understand(K2)	30%	30%	30%
Apply(K3)			
Analyse(K4)	30%	30%	30%
Evaluate(K5)	10%	10%	10%
Create(K6)			

Mark distribution

Total Marks	CIE	ESE	ESE Duration
100	40	60	3 hours

Continuous Internal Evaluation Pattern:

Attendance	: 8 marks
Continuous Assessment Test (2 numbers)	: 20 marks
Assignment/Seminar/Course project	: 12 marks

End Semester Examination Pattern: There will be two parts; Part A and Part B. Part A contains 10 compulsory short answer questions, 2 from each module. Each question carries 3 marks. Part B contains 2 questions from each module of which student should answer any one. Each question can have maximum 2 sub-divisions and carry 6 marks

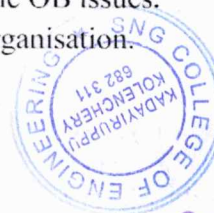
Course Level Assessment Questions

Course Outcome 1 (CO1):

1. Describe the importance of inter-personal skills in the workplace.
2. Analyse the challenges and opportunities for managers in using OB concepts.
3. "The workplace discriminations undermine organisational performance", Justify.

Course Outcome 2 (CO2):

1. Identify the major job attitude and job satisfaction parameters.
2. How to apply concepts about emotions and moods to specific OB issues.
3. Differentiate between person fit for job and person fit for organisation.



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Course Outcome 3(CO3):

1. What is learning and what are the theories of learning?
2. How do individual differences and organisational constraints influence decision making?
3. Identify how employee involvement measures motivate employees.

Course Outcome 4 (CO4):

1. Differentiate group and team.
2. Relate the contemporary theories of leadership to earlier foundational theories.
3. What are three types of conflicts and the three loci of conflict?

Course Outcome 5 (CO5):

1. What are the functional and dysfunctional effects of organisational culture?
2. What are your suggestions to overcome resistance to change in an organization?
3. Identify the potential environmental, organisational and personal sources of stress at work.

Model Question paper

Reg No.:	Name:	
APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY		
FIRST SEMESTER M.C.A.DEGREE EXAMINATION, MODEL QUESTION PAPER		
20MCA164 – Organisational Behaviour		
Max. Marks: 60	Estd.	Duration: 3 Hours
PART A		
<i>Answer all questions, each carries 3 marks.</i>		Marks
1	Define organisational behaviour. What is the objective of learning this subject in this programme?	3

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2	What is workforce diversity? How to manage diversity?	3
3	State and explain the foundations of individual behaviour.	3
4	Differentiate 'Classical conditioning' and 'Operant conditioning' behavioural theories.	3
5	Describe how an understanding of attitudes is useful for the study of organisational behaviour.	3
6	What is job design? Describe different approaches to job design.	3
7	What is a team? Can groups become team? Defend your answer.	3
8	What is the difference between transformational leadership, transactional leadership and charismatic leadership?	3
9	What is creativity? How creativity can be enhanced in organisations?	3
10	What is Organisational Development? Why is it undertaken by organisations?	3
PART B		
<i>Answer any one question from each module. Each question carries 6 marks.</i>		
Module I		
11	State your views on the following statement: "People influence organizations and organizations influence people".	6
OR		
12	Why have career management and talent management become important these days? Justify your points.	6
Module II		
13	What is personality? What are its determinants? As per your opinion, which of them are more important in shaping personality.	6
OR		
14	From your own experience, provide three examples of perceptual errors. Discuss the outcomes of each instance.	6




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<i>Module III</i>		
15	Compare and contrast Maslow's need hierarchy theory with Herzberg's two-factor theory of motivation.	6
<i>OR</i>		
16	What is the relationship between stress and personality? What aspects of personality might tend to increase or decrease stress?	6
<i>Module IV</i>		
17	Why groupthink is to be avoided? How might a manager attempt to ensure that groupthink does not occur in his / her group?	6
<i>OR</i>		
18	What are the potential problems with upward and downward communications? How can managers alleviate these problems?	6
<i>Module V</i>		
19	What are the obstacles to change organisational culture? How can change be brought about?	6
<i>OR</i>		
20	What are the forces leading to change in organisations? Using Lewin's theory justify why the change is resisted.	6

Syllabus

Module 1

Nature of Organisational Behaviour: What are Organisations? – Why do Organisations Exist? – Nature of Organisational Behaviour – Foundations of OB – Contemporary OB – Scope of Organisational Behaviour – Contextual Perspectives of OB – Evolution of OB – OB Model

Management and Managers: Functions of Management – Manager's Roles – Types of Managers – Evolution of Management Theory – Contemporary Trends in Management Thinking

Challenges in OB: Managing Inclusivity / Diversity – Career Management – Talent Management – Globalisation



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Module 2

Foundations of Individual Behaviour: Personal Factors – Environmental Factors – Organisational Systems and Resources – Models of Individual Behaviour

Intelligence: Nature of Intelligence – Types of Intelligence – Model, Theories, Measurement of Intelligence – Factors Influencing Intelligence

Personality: Nature of Personality – The Shaping of Personality – Determinants of Personality – Personality Structure – OB Related Personality Traits

Perception and Attribution: Perception: Meaning and Definition – Factors Influencing Perception – Perceptual Process – Perception and OB

Learning: Explicit and Tacit Knowledge – How Learning Occurs? – Principles of Learning – Learning and OB

Module 3

Attitudes and Values: Nature of Attitudes – Components of Attitudes – Formation of Attitudes – Functions of Attitudes – Changing Attitudes – Work-related Attitudes – Values

Motivation: Nature of Motivation – Importance of Motivation – Motivational Challenges – Theories on Motivation

Applied Motivational Practices: Rewards – Job Design – Behaviour Modification – Empowerment – Problem Employees – Quality of Work Life – Employee Engagement

Work Stress: Work Stress Model – Burnout – Stress Management – Stress and Performance

Module 4

Group Dynamics: Nature of Groups – Types of Groups – Group Development – Usefulness & Pitfalls of Groups – Determinants of Group Behaviour – Group Structuring – Group Decision Making

Team Dynamics: Teams vs. Groups – Benefits from Teams – Types of Teams – Implementing Teams in Organisations – Team Properties – Effective Teamwork

Workplace Behaviour: Nature of Conflict – Changing Views of Conflict – Functional and Dysfunctional Conflict – The Process of Conflict – Levels of Conflict – Conflict Resolution – Conflict Management Styles – Managerial Implications – Negotiation and Conflict Resolution

Leadership: Nature of Leadership – Leadership and Management – Importance of Leadership – Formal and Informal Leadership – Leadership Styles and Their Implications – Theories of Leadership – Contemporary Issues on Leadership – Leadership Development

Communication: Interpersonal Communication – Organisational Communication – Communication Networks – Communication Roles – Informal Communication – Communication Media – Information Technologies – Managerial Implications



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Module 5

Organisations: Nature of Organisations – Organisational Structure – Key Factors of Organisational Structure – Types of Organisational Structures – Organisations for Future – Informal Organisations – Managerial Implications

Organisational Culture: Cultural Dimensions – How is Culture Created? – Sustaining Culture – Effects of Culture – Changing Organisational Culture – Creativity in Organisations – Innovation in Organisations

Organisational Change and Development: Nature of Change – Levels of Change – Types of Change – Forces for Change in Organisations – Resistance to Change – Force Field Theory of Change - The Change Process – Organisational Development – Managerial Implications

Text Books

1. K Aswathappa, *Organizational Behaviour*, Himalaya Publishing House, 2018.
2. Robbins, Stephen, Timothy, A & Sanghi, S. "*Organizational Behavior*", 13th Edn, Pearson Education, 2009.

Reference Books

1. Mc Shane & Von Glinow, "*Organizational Behavior*", Mc Graw Hill Publications, New Delhi, 2008
2. *Understanding Organizational Behaviour* by Udai Pareek, Oxford University Press (Third Edition)
3. *Behaviour in Organizations* by Jerald Greenberg and Robert A. Baron, PHI learning private Ltd, New Delhi (Ninth Edition).
4. Laurie J. Mullins, *Management and Organisational Behaviour*, Oxford Publishers, New Delhi, 2007.
5. *ORGB* by Nelson, Quick and Khandelwal, Cengage Learning New Delhi (second edition).



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Course Contents and Lecture Schedule

Topic	No. of lectures (49 Hrs)
Module 1	9 Hrs
Nature of Organisational Behaviour	3
Management and Managers	3
Challenges in OB	3
Module 2	10 Hrs
Foundations of Individual Behaviour	2
Intelligence	2
Personality	2
Perception and Attribution	2
Learning	2
Module 3	9 Hrs
Attitudes and Values	2
Motivation	2
Applied Motivational Practices	3
Work Stress	2
Module 4	12 Hrs
Group Dynamics	2
Team Dynamics	2
Workplace Behaviour	3
Leadership	3
Communication	2
Module 5	9 Hrs
Organisations	3
Organisational Culture	3
Organisational Change and Development	3




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Course code	Course Name	L-T-P - Credits	Year of Introduction
RLMCA107	Principles of Management	3-1-0-4	2016
Course Objectives <ul style="list-style-type: none"> To develop ability to critically analyze and evaluate a variety of management practices. To understand and apply a variety of management and organisational theories in practice. To be able to mirror existing practices or to generate their own innovative management competencies, required for today's complex and global workplace. 			
Syllabus Definition, a management, managerial roles, making process. Early contributors and their contributions field of management. Planning, Organizing, Staffing and HRD functions, Directing and Controlling form the core content of this course.			
Expected Outcome The students will be able to <ol style="list-style-type: none"> understand management as a process critically analyse and evaluate management theories and practices plan and make decisions for organisations do staffing and related HRD functions be aware about quality standards understand the marketing basics 			
References <ol style="list-style-type: none"> Gary Dessler, Biju Varkkey, "Human Resource Management", Pearson Education India, 14th Edition. Harold Koontz and Heinz Weihrich, "Essentials of Management", McGraw Hill Education, 10th Edition (2015). L M Prasad, "Principles of Management", Sultan Chand & Sons, 8th Edition (2010) L M Prasad, "Principles of Management", Sultan Chand & Sons, 8th Edition (2010) Peter F Drucker, "The Practice of Management", Butterworth-Heinemann publication, 2nd Edition (2007) Philip Kotler, "Marketing Management", Pearson Education India, 15th Edition. R N Gupta, "Principles of Management", S. Chand & Company Ltd., (2010) Robbins and Coulter, Management, Pearson Education 13th Edition, 2016, Tripathi, "Principles of Management", McGraw Hill Education, 5th Edition (2012) 			
Suggested MOOCs <ol style="list-style-type: none"> Management Functions: http://nptel.ac.in/courses/122108038/ Leadership: http://nptel.ac.in/courses/110105033/33 			
Course Plan			
Module	Contents	Hours	Sem. Exam Marks
I	Introduction to Management: Basic Managerial Concepts, Levels of management, Managerial Skills, Managerial roles Decision Making- Concept, types of decision, decision making process. Management functions- Planning, Organising, Staffing, Directing and Controlling.	7	15%
II	Early Contributions in Management: Management thought - Classical approach, scientific management, contributions of Taylor, Gilbreths, Fayol's 14 principles of management	10	15%


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	Human relation approach - contribution Elton Mayo Systems approach - organization as an open and Contingency approach.		
FIRST INTERNAL EXAMINATION			
II	Planning: Nature and importance of planning, types of plans - Steps in planning, Levels of planning - The Planning Process - MBO definition and process, SWOT Analysis, importance.	9	15%
	Organising : Nature of organizing, Departmentation - need and importance, span of control in management, factors affecting span of management. Organisation structure - Formal and informal, Types of organization structure line, line and staff, functional, divisional, project, matrix, free form, virtual. Delegation of authority, Steps in delegation and Principles of delegation	10	15%
	Staffing and related HRD Functions: meaning, nature, staffing process, Job analysis and manpower planning, job description and job specification, Recruitment & selection, selection process, tests and interviews. Training and development - concept and methods, Performance appraisal- concept and methods.	10	20%
SECOND INTERNAL EXAMINATION			
VI	Directing and Controlling: Supervision, Motivation - significance, motivational theories - Maslow's need hierarchy. Basic control process - control as a feedback system. Quality engineering, quality control, control chart (basic concepts), Introduction to ISO 9000 and 14000 standards, TQM, Six Sigma concepts, Bench marking, Introduction to marketing, marketing mix, Product Life cycle.	10	20%
END SEMESTER EXAM			
QUESTION PAPER PATTERN			
<p>There will be two parts in the Question paper - Part A and Part B. Part A will have 8 short answer questions of 3 marks each (8 X 3 M = 24 M). There will be no choice questions. Part B will have 6 essay questions one from each module of 6 marks each, with an alternative choice question from the same module (6 x 6M=36M). The maximum number of sub part questions in Part B to be limited to 2. The total marks assigned to questions in Part A (Short answer) and Part B (Essay) together from a single module will not exceed the marks assigned to that module specified in the course plan.</p>			




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20MCA289	SOCIAL NETWORK ANALYSIS	CATEGORY	L	T	P	CREDIT
		ELECTIVE	3	1	0	4

Preamble: This course intends to provide insight into social network analysis. The objective of this course is to enable students analyse and visualize network data. This course will create an understanding about the semantic web, structure of various social networks and the structure of search engines.

Prerequisite: Basic concepts of graph theory and networks

Course Outcomes: After the completion of the course the student will be able to

CO No.	Course Outcome (CO)	Bloom's Category Level
CO 1	Explain the basic concepts of semantic web and social network analysis.	Level 2: Understand
CO 2	Describe the ontology-based knowledge representation techniques in social network.	Level 2: Understand
CO 3	Discuss aggregation of social network information and representation of social individuals and social relationships.	Level 2: Understand
CO 4	Describe the structure of the Web and Facebook as a graph and the algorithms for searching and community discovery.	Level 2: Understand
CO 5	Explain the general architecture of a search engine and specifically the Google search engine architecture.	Level 2: Understand

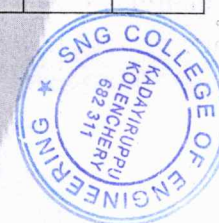
Mapping of course outcomes with program outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1	2	2					1					
CO 2	2	2					1					
CO 3	2	2					2					
CO 4	2	3		2	2	2	2			2		
CO 5	2	3		2	2		2					

3/2/1: High/Medium/Low

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		End Semester Examination
	1	2	
Remember	15	15	20



Understand	35	35	40
Apply			
Analyze			
Evaluate			
Create			

Mark distribution

Total Marks	CIE	ESE	ESE Duration
100	40	60	3 hours

Continuous Internal Evaluation Pattern:

Attendance	: 8 marks
Continuous Assessment Test (2 numbers)	: 20 marks
Assignment/Quiz/Course project	: 12 marks

End Semester Examination Pattern: There will be two parts: Part A and Part B. Part A contains 10 compulsory short answer questions, 2 from each module. Each question carries 3 marks. Part B contains 2 questions from each module of which student should answer any one. Each question can have maximum 2 sub-divisions and carry 6 marks.

Course Level Assessment Questions

Course Outcome 1 (CO1):

1. Explain the development of semantic Web and the emergence of Social Web.
2. Describe the global structure social networks.
3. Discuss in detail about the macro-structure of social networks.
4. "Most network analysis methods work on an abstract, graph-based representation of real-world networks". Justify this statement.

Course Outcome 2 (CO2)

1. Describe the characteristics of Resource Description Framework (RDF).
2. Compare the features of Web Ontology Language (WOL) and Unified Modeling Language (UML).
3. Compare the features of Web Ontology Language (WOL) and Entity Relationship (ER) Model.

Course Outcome 3(CO3):

1. Describe the ontological representation of social individuals.
2. Explain the generic architecture of Semantic Web applications.
3. Discuss how semantic web applications can be built with social network features?

Course Outcome 4 (CO4):

1. Describe Zipf's Law.
2. Write the limitations of HyperANF Algorithm and explain how it can be sorted out using the Iterative Fringe Upper Bound (iFUB) Algorithm.
3. What is meant by Degree Assortativity? What is the use of this measure?
4. "A user who logs in more generally has more friends on Facebook", describe how can we conclude this statement.

Course Outcome 5 (CO5):

1. Draw the architecture of a general search engine and explain how it works.
2. Explain how the HITS Algorithm works to assign ranks to web pages.
3. Compare the HITS Algorithm and the Page Rank Algorithm.

Model Question Paper
Course Code: 20MCA289

Course Name: SOCIAL NETWORK ANALYSIS

Max. Marks :60

Duration: 3 Hrs

Part A

*Answer all questions. Each question carries 3 marks (10 * 3 = 30 Marks)*

1. What is meant by semantic web?
2. Write notes on personal networks.
3. Define Electronic discussion networks.
4. List out the features of blogs that can be used for social network extraction.
5. Explain how the reasoning with instance equality is done in social network data?
6. What is meant by Evaluating Smushing?
7. Define "Power Law".
8. What is "Spid"? How it is used to differentiate between web-network and social network?
9. What are the basic functions of the storage repository of a search engine?
10. How can we identify web spam pages?

Part B

*Answer all questions. Each question carries 6 marks. (5 * 6 = 30 Marks)*

11. List and explain various measures in network analysis.

6 marks



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OR

12. Describe the macro-structure of social networks. 6 marks

13. What is meant by ontology-based knowledge representation? Explain its role in the semantic web. 6 marks

OR

14. Compare the features of Web Ontology Language (WOL) and Extensible Markup Language (XML). 6 marks

15. Describe how aggregating and reasoning can be done on social network data. 6 marks

OR

16. Discuss the ontological representation of social relationships. 6 marks

17. Define the following with suitable example: 2 marks
 a) Rank exponent 2 marks
 b) Hop plot exponent 2 marks
 c) Eigen exponent 2 marks

OR

18. Explain how to generate in-degree and out-degree distributions on the graph of the Web crawl. 6 marks

19. Describe how the web crawler module in a search engine does the page selection and page refresh. 6 marks

OR

20. Draw the architecture of Google search engine and comment on each of its components. 6 marks

Syllabus

Module I (9 Hours)
Introduction to the Semantic Web and Social Networks: The Semantic Web, Limitations of the current Web, The semantic solution, Development of the Semantic Web, The emergence of the social web, Social Network Analysis, Development of Social Network Analysis, The global structure of networks, The macro-structure of social networks, Personal networks.
Module II (8 Hours)
Electronic sources for network analysis: Electronic discussion networks, Blogs and online communities, Web-based networks.



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Knowledge Representation on the Semantic Web: Ontologies and their role in the Semantic Web, Ontology languages for the Semantic Web, The Resource Description Framework (RDF) and RDF Schema, The Web Ontology Language (OWL), Comparison of Ontology languages with the Unified Modelling Language (UML), Comparison to the Entity/Relationship (E/R) model and the Relational model, Comparison to the Extensible Markup Language (XML) and XML Schema.

Module III (8 Hours)

Modelling and aggregating social network data:

Network data representation, Ontological representation of social individuals, Ontological representation of social relationships, Aggregating and reasoning with social network data, Representing identity, On the notion of equality, Determining equality, Reasoning with instance equality, Evaluating smushing.

Module IV (10 Hours)

Graph Structure of the Web: Breadth First Search (BFS) Algorithm, Strongly Connected Components (SCC) Algorithm, Weakly Connected Components (WCC) Algorithm, In-degree and out-degree distributions, Connected Components, Zipf's Law, Rank Exponent R, Out-Degree Exponent O, Hop Plot Exponent H, Eigen Exponent E.

Graph Structure of Facebook: Hyper ANF Algorithm, Iterative Fringe Upper Bound (iFUB) Algorithm, Spid, Degree Distribution, Path Length, Component Size, Clustering Coefficient and Degeneracy, Friends-of-Friends, Degree Assortativity, Login Correlation, Effects of Age, Gender and Country of Origin.

Module V (10 Hours)

Link Analysis: Search Engine – Search engine architecture, Crawling, Storage, Indexing, Ranking, HITS Algorithm, Page rank algorithm, Random walk, SALSA Algorithm, Bayesian Algorithm; Google - Google architecture, Data Structures, Crawling, Searching, Web Spam Pages.

Textbooks.

1. Social Networks and the Semantic Web, Peter Mika, Springer, 2007. (For Modules 1, 2 & 3)
2. Practical Social Network Analysis with Python, Krishna Raj P. M., Ankith Mohan, K. G. Srinivasa, Springer, 2018. (For Modules 4 & 5)

References

1. Social Network Analysis, John Scott, SAGE Publications, 4th Edition (2017)
2. Social Network Analysis - Interdisciplinary Approaches and Case Studies, Xiaoming Fu, Jar-Der Luo and Margarete Boos, CRC Press (2017)
3. Handbook of Social Network Analysis, John Scott and Peter J. Carrington, SAGE Publications (2011)

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4. Social Network Analysis - Methods and Applications, Stanley Wasserman and Katherine Faust, Cambridge University Press (2012)

Web - References

1. https://onlinecourses.nptel.ac.in/noc20_cs78/preview
2. <https://www.coursera.org/learn/social-network-analysis>
3. <https://www.coursera.org/learn/python-social-network-analysis>

Course Contents and Lecture Schedule

No	Topic	No. of Lectures
1	Module 1	9 Hours
1.1	The Semantic Web, Limitations of the current Web	1
1.2	The semantic solution	1
1.3	Development of the Semantic Web	1
1.4	The emergence of the Social Web	1
1.5	Social Network Analysis	1
1.6	Development of Social Network Analysis	1
1.7	The global structure of networks	1
1.8	The macro-structure of social networks	1
1.9	Personal networks	1
2	Module 2	8 Hours
2.1	Electronic sources for network analysis, Electronic discussion networks	1
2.2	Blogs and online communities	1
2.3	Web-based networks	1
2.4	Knowledge Representation on the Semantic Web	1
2.5	Ontologies and their role in the Semantic Web	1
2.6	Ontology languages for the Semantic Web, The Resource Description Framework (RDF) and RDF Schema	1
2.7	The Web Ontology Language (OWL), Comparison of Ontology languages with the Unified Modelling Language (UML)	1
2.8	Comparison to the Entity/Relationship (E/R) model and the Relational model, Comparison to the Extensible Markup Language (XML) and XML Schema	1
3	Module 3	8 Hours
3.1	Modelling and aggregating social network data, Network data representation	1
3.2	Ontological representation of social individuals	1
3.3	Ontological representation of social relationships	1
3.4	Aggregating and reasoning with social network data	1
3.5	Representing identity	1
3.6	Notion of equality, Determining equality	1

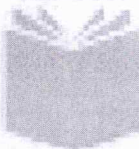
3.7	Reasoning with instance equality	1
3.8	Evaluating smushing	1
4	Module 4	10 Hours
4.1	Graph Structure of the Web	1
4.2	Breadth First Search (BFS) Algorithm	1
4.3	Strongly Connected Components (SCC) Algorithm, Weakly Connected Components (WCC) Algorithm	1
4.4	In-degree and out- degree distributions, Connected Components	1
4.5	Zipf's Law	1
4.6	Rank Exponent R, Out-Degree Exponent O, Hop Plot Exponent H, Eigen Exponent E	1
4.7	Graph Structure of Facebook: HyperANF Algorithm	1
4.8	Iterative Fringe Upper Bound (iFUB) Algorithm, Spid, Degree Distribution, Path Length	1
4.9	Component Size, Clustering Coefficient and Degeneracy, Friends-of-Friends	1
4.10	Degree Assortativity, Login Correlation, Effects of Age, Gender and Country of Origin	1
5	Module 5	10 Hours
5.1	Link Analysis: Search Engine – Search engine architecture	1
5.2	Crawling, Storage, Indexing	1
5.3	Ranking, HITS Algorithm	1
5.4	Page rank algorithm	1
5.5	Random walk	1
5.6	SALSA Algorithm	1
5.7	Bayesian Algorithm	1
5.8	Google - Google architecture	1
5.9	Data Structures, Crawling, Searching	1
5.10	Web Spam Pages	1

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Estd.



2014

Course No.	Course Name	L-T-P Credits	Year of Introduction
RLIMCA303	E-Commerce	3-1-0-4	2016
Course Objectives			
<ul style="list-style-type: none"> ● Define E-commerce and describe how it differs from e-business. ● Describe major business models of E-Commerce ● Describe how Internet and Web features support E-Commerce ● Understand the key dimensions of E-Security ● Understand the features of E- Payment systems ● Understand the concepts and technologies of E- marketing systems 			
Syllabus			
Introduction to e-Commerce, Business Models and Concepts, Technology Infrastructure for E-Commerce, E-Security , E-Payment and E-Marketing			
Expected Outcome			
<p>At the end of the course,</p> <ul style="list-style-type: none"> ● The students are expected to realise the problems involved in designing and building e-commerce systems. ● Understand the need to design E-Commerce systems that fully meet the requirements of the intended users. 			
References			
<ol style="list-style-type: none"> 1. Kenneth C. Laudon, Carol Guercio Traver, "E-Commerce", Pearson India, 2016 2. P T Joseph, S.J., "E-Commerce An Indian Perspective", PHI, Fifth edition ,2015 3. Whiteley,"e-Commerce Strategies, Technologies and Applications", McGraw Hill, 2014 4. Tharam Dillon, Henry Chan, "E-Commerce Fundamentals and Applications", John Wiley & Sons Ltd, 2014 			



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MASTER OF BUSINESS ADMINISTRATION

Programme
Under



APJ Abdul Kalam Technological University

SYLLABUS & COURSE PLAN

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Course No.	Course Name	L-T-P	Credits	Year of Introduction
12	Organizational Behaviour I	4-0-0	3	2015

Course Objectives

The course focuses on managing individuals at work. The objective is to equip the students with an essential knowledge base on behavioural dynamics of individuals with necessary models, tools, and techniques, for diagnosing, predicting and controlling human behaviour and to develop the basic human relations skills as a prospective manager.

Syllabus

Fundamentals of Organizational Behaviour, Understanding Organizational Behaviour, Effectiveness in organizations, Social systems and organizational culture, Understanding and Managing Individual Behaviour, Job Design, Work and Motivation, Evaluation, Feedback and Rewards, Stress and Counselling.

Expected Outcome

On completion of the course, the students are expected to enable the students to learn what actions are appropriate for different situations and apply the theory in order to be effective leaders in the context of organisational behaviour theories, models and concepts

References

1. Robbins, Judge & Sanghi, *Organizational Behaviour*, 12th Ed. Prentice Hall India
2. McShane, Glinow, *Organizational Behaviour*, Tata McGraw Hill
3. Don Hellriegel; John W. Slocum; Richard W. Woodman, *Organizational Behavior*, 8th Ed., Thomson South-Western



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COURSE PLAN

Unit	Topics	Hours allotted	% of marks in final Exam.
I	Disciplines contributing to OB - Psychology, Sociology, Anthropology, Social Psychology, Economics & Political Science Approaches to the study of OB - Human Resource Approach, Contingency Approach, Productivity Approach, and System Approach - Fundamental principles, theories and concepts in organization design and development	9	20
II	Understanding Organizational Behaviour - Fundamental Concepts, Organizational processes, Organizational structure, Organizational Change and Innovation processes - Effectiveness in organizations - Models of Organizational Behaviour, Systems theory and time dimension of effectiveness, Developing competencies, Limitations of Organizational Behaviour, Continuing challenges	6	15
First Internal Examination			
III	Individual differences and work behaviour - Why individual differences are important, The basis for understanding Work Behaviour, Individual differences influencing Work Behaviour. Personality - Sources of personality differences, Personality structure, Personality and Behaviour, Measuring Personality Attitudes - The nature of Employee Attitudes, Effects of Employee Attitudes, Studying Job satisfaction, Changing Employee Attitudes. Perceptions, Attributions and Emotions - The perceptual process, Perceptual grouping, Impression management, Emotions, Emotional Intelligence - Motivation - Concept of Motivation, Content approaches, Process approaches, Motivation and psychological contract	15	30
IV	Managing Individuals at Work: Measuring personality attitudes; managing employee attitudes Managing Teams at Work: Definition of Group - group development- group structure - teams -Formal Organization and Informal Groups and their interaction	5	10
Second Internal Examination			
IV	Developing high performance teams - turning individuals into team players developing interpersonal awareness - Johari Window- Transactional Analysis - leadership - theories – developing leadership skills	4	10
V	Managing Power, Politics and Conflict: Power - basis of power - power tactics - Politics – consequences of political behavior - Conflict Management: Different views of conflict - conflict process - levels of conflict - Constructive and Destructive conflict - Conflict process - strategies for encouraging constructive conflict - Conflict resolution strategies	6	15
Final Examination			

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Course No.	Course Name	L-T-P	Credits	Year of Introduction
16	Business and Society	4-0-0	3	2015

Course Objectives

The objectives for this course are the following:

1. To develop broader and more complete understanding of the business and society relationship
2. To help the student perceive and understand the importance of sound business ethics practices in the effective functioning of organizations.
3. To comprehend major stakeholder groups which interact with business organizations and the kinds of expectations they may hold with respect to their role in business enterprise and society.
4. To understand major corporate social responsibilities of business:
5. Impact of the human activities on the environment

Syllabus

Business Environment, Economic Growth, CSR, Public private Partnerships, Privatization, Environmental Management, Sustainable Development

Expected Outcome

The successful completion of this course will impart an understanding of the relationship between business and society. This will enable students to perceive sound business ethics and social responsibilities of business.

References

1. John Steiner, George Steiner, *Business, Government and Society: A Managerial Perspective*, 13/e, McGraw-Hill Higher Education, 2011
2. John F. Steiner, *Business, Government, and Society: A Managerial Perspective, Text and Cases* 12/e, McGraw-Hill/Irwin, 2008.
3. Francis Cherunilam, *Business and Government*, HPH, 2013.
4. Fernando A. C., *Corporate Governance: principles, policies and practices*, 2/e, Pearson Edn., India, 2011.
5. Ghosh B. N., *Business Ethics and Corporate Governance*, McGraw Hill Education (India) Private Limited, 2011.
6. Bala Krishnamurthy, *Environmental Management: Text and Cases*, PHI, New Delhi.
7. Arindita Basak, *Environmental Studies*, Pearson Education, New Delhi.
8. Justin Paul, *Business Environment -Text and Cases*, Tata McGraw Hill Education, New Delhi, 2010



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COURSE PLAN

Unit	Topics	Hours allotted	% of marks In final Exam.
I	Roles of Business, Government, and Society: Interdependence and Conflict, Regulation of Business, Functions of State; Economic roles of government; Government and legal environment; Poverty, Inequality and Economic Growth: Industrial Development, Rural- Urban Dynamics, Population and Development, Finance for Development	9	15
II	Business in a Global Environment: Business as Blending of People Technology and Ethical Behaviour, Achieving Business Success through Social Responsibilities. Trade and Development, State and the Market, Privatization and Regulation, Institutions and Growth.	7	15
First Internal Examination			
III	Public Private Partnerships: The Rationale for Public Private Partnerships, Different Kinds of Public Private Partnerships with a special emphasis on the Build Operate and Transfer Model (BOT). Issues in Regulation that come about with privatization, Pricing mechanisms available to a regulator to ensure universal access and efficiency, Discussion of the privatization experience in different sectors, water, electricity, telecommunication, and railways with a special emphasis on India.	10	25
III	Coping with Global Competition, Conflict with Nation States. Non-Governmental organizations (NGO) - impact on Indian rural development, education and charity. Types and nature of social responsibilities, CSR principles and strategies, models of CSR, Best practices of CSR, Need of CSR, Indian perspective	8	15
Second Internal Examination			
IV	Environmental Management - Definition, scope, importance and need - Concept of Ecosystem: Kinds of Resources: Renewable and Non Renewable resources- forests, water, mineral, food, energy, land resources - Role and Impact of Humankind: Population and development- pollution-definition-kinds-effects-climate change	5	15
V	Sustainable Development: Concept, principles- social, economic and environmental dimensions- hurdles, Indicators-Millennium Development Goals- Environment Management Systems: EMS- planning, implementation – environmental audit- environmental labeling- insight into current developments in energy conservation-3Rs	6	15
Final Examination			

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Course No.	Course Name	L-T-P	Credits	Year of Introduction
17	Soft Skills I	0-2-0	0	2015

Course Objectives

The objective of this course is to enable students have a basic knowledge of the recent developments in Information technology and its application in effective communication. The course also emphasize on personal grooming and development with due accentuation to soft skills development to transform the learners to employment ready youth.

Syllabus

Personal Grooming & Development, Presentation and Negotiation Skills, Levels of Public Interaction

Expected Outcome

1. Enhancement of the holistic development of students and improvement of their employability skills.
2. To develop inter personal skills and be an effective goal oriented team player.
3. To develop professionals with idealistic, practical and moral values.
4. To develop communication and problem solving skills.
5. To re-engineer attitude and understand its influence on behavior.

References

1. Penrose, Rasberry, Myers, *Advanced Business Communication*, 5/e, Cengage Learning, 2004.
2. Lehman, DuFrene, Sinha, *BCOM*, 2/e, Cengage Learning, 2012
3. Madhukar R. K, *Business Communication*, 2/e, Vikas Publishing House.



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COURSE PLAN

Unit	Topics	Hours allotted	% of marks in final (T3) Exam.
I	Self-Management Self Evaluation-Self Discipline-Self Criticism-Recognition of one's own limits and deficiencies - Independency-Self Awareness- Attitude: Factors influencing Attitude, Challenges and lessons from Attitude.	4	2
II	Goal Setting : Wish List, SMART Goals, Blue print for success, Short Term, Long Term, Life Time Goals	3	6
First Internal Examination			
III	Listening Skills : Listening to specific Information, identifying main issues, seeing beyond surface meanings	3	6
IV	Ethics and Etiquette-Business Ethics-Etiquette in social as well as Office settings-Email etiquette-Telephone Etiquette	4	6
Second Internal Examination			
V	Presentation Skills – Book Reviews and Summary writing	8	10
Final Examination			

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SECOND TRIMESTER SYLLABUS

Course No.	Course Name	L-T-P	Credits	Year of Introduction
21	Organizational Behaviour II	4-0-0	3	2015

Course Objectives

The course focuses on managing teams at work and the organization system as a whole. The objective is to understand how individuals, groups and whole organizations work together more effectively within the increasing pace of corporate change, dramatic restructuring and downsizing and advanced global competition.

Syllabus

Group Behaviour and Interpersonal Influence, Organizational Processes, Organizational Design, Change and Innovation, Emerging Aspects of Organizational Behaviour.

Expected Outcome

- Apply problem solving and critical thinking abilities to analyse the kinds of choices available for developing alternative organisational behaviour approaches in the workplace
- Form an appreciation of the complexities and uncertainties of organisational behaviour by examining your own role in the light of experience of real-time problem settings
- Demonstrate a developmental approach to personal and key skills of planning, review and feedback and verbal communication

References

1. Aswathappa, K. *Organizational Behavior*. Himalaya Publishing House, 2007.
2. Berg, Green. *Behavior in Organizations*. New Delhi: Pearson, 2013.
3. Chandran, Jit S. *Organizational Behavior*. New Delhi: Vikas Publishing House, Third Edition.
4. David, Johnson J. *Organizational Communication Structure*. Ablex Publishing, 1993.
5. Dwivedi, R. S. *Human Relations & Organizational Behavior: A Global Perspective*. Delhi: Macmillan India, 2001.
6. Luthans, Fred. *Organisation Behaviour*. New Delhi: McGraw Hill Education, 2011.
7. McShane, Steven Lattimore, Mara Olekalns and Tony Travaglioni. *Organizational Behavior: Emerging Knowledge, Global Insights*. McGraw Hill, 2012.
8. Newstrom, John W and Keith Davis. *Organizational Behavior: Human Behavior at Work*. New York: McGraw-Hill, 2014.
9. Poertner, Shirley and Karen Massetti Miller. *The art of giving and receiving feedback*. Coastal Training Technologies, 1996.
10. Robins, Stephen P. *Organization Behaviour*. New Delhi: Pearson Education, 2012.
11. Sanghi, Seema. *Essentials of Organisational Behaviour*. New Delhi: Pearson, 2010.
12. Sekaran, Uma. *Organizational Behavior*. New Delhi: McGraw-hill, 2004.
13. Werner, David. *Managing Company-wide Communication*. Chapman & Hall, 1995.

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Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Social systems and organizational culture - Understanding a Social System, Social Culture, Role, Status, Organizational culture, Influencing culture change, Sustaining the culture, Characteristics of effective socialization	7	20
II	Managing the Organization System: Effects of organization culture on employee performance - creating and sustaining organization culture - Management of Change: forces responsible for change - resistance to change overcoming resistance to change - planned change – approaches to manage organization change -OD inventions- creating a culture for change - Learning Organizations	10	20
First Internal Examination			
III	Empowerment and Participation- The nature of empowerment and Participation- How participation works- Programs for participation-Important considerations in participation- Assertive Behaviour: Interpersonal Orientations- Facilitating smooth relations- Stroking	6	10
IV	Managing misbehaviour - The emergence in Management of the study of misbehaviour, Selected misbehaviours; work stress and its management - Stress and Counselling - What is stress?, Stress model, Work stressors, Stress outcomes, Stress moderators, Stress prevention and management,	9	20
Second Internal Examination			
IV	Employee counselling, Types of counselling-Ethical decision making in organisations: Factors that inhibit or facilitate ethical decision making in organizations, Steps to ensure ethical decisions	6	10
V	Global implications of organizational behavior: International setting for the management criteria - planning, organizing, staffing, controlling and leading; Cultural influences on international negotiations; managing multi-cultural teams; Organisational structure that connects organizational departments, functions and geography to achieve organizational goals; Impacts of globalization on organizational culture	7	20
Trimester Examination			

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Course No.	Course Name	L-T-P	Credits	Year of Introduction
27	Soft Skills II	0-2-0	-	2015

Course Objectives

The objective of this course is to enable students to understand what 'personality' means, understand the different kinds of personalities, to develop public speaking skills, time management and team work to prepare for the corporate life while getting the grip on basics of emotional intelligence for applying all throughout one's life

Syllabus

Personality, Self-motivation, time management, team work, emotional intelligence

Expected Outcome

1. Enhancement of the holistic development of students and improvement of their employability skills.
2. To develop emotional intelligence
3. To develop professionals with idealistic, practical and moral values.
4. To develop time management skills
5. To get over the fear of public speaking

References

1. Pravesh Kumar (2005). All about self- Motivation. New Delhi: Goodwill Publishing House.
2. Hurlock, E.B (2006). Personality Development, 28th Reprint. New Delhi: Tata Mc Graw Hill.
3. The Emotionally Intelligent Manager - David R. Caruso, Peter Salovey

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Definition of Personality - Determinants of Personality - biological, psychological and socio- cultural factors - Misconceptions and clarifications - Need for personality development	4	2
II	Time Management - definition - importance - functions Using to-do lists - procrastination - delegating effectively	4	6
III	Concept of team in work situation, promotion of team spirit, characteristics of team player - Awareness of one's own leadership style, performance and qualities	4	10
IV	Emotional Intelligence : what it means - role and benefit - awareness of emotions in self and others - and management of emotions in ourselves and in others (Use of EI tests to assess)	4	10
V	Public Speaking - Prepared Speech by students for 5 minutes	6	12



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Course Objectives

This subject provides the key aspects of managing human resources in domestic and

Course No.	Course Name	L-T-P	Credits	Year of Introduction
33	Human Resource Management	4-0-0	3	2016

multi-national organizations, including a consideration of labour relations and diversity management issues. Topics include job analysis, planning, recruiting, selection, orientation, training and development, performance appraisal, compensation and benefits, dispute resolution, and legal frameworks for both the non-union and union environments.

Syllabus

Evolution of HR, Definition- Meaning- objectives-differences between personnel management and HRM, Human Resource Acquisition, Analysis and Designing of Jobs, HR planning, Human Resource Development, Compensation, Employee Relations

Expected Outcome

The students are expected to have critical skills required to manage human resources in a multitude of workplace environments. Students are expected to get basic knowledge about management of Human Resources and Industrial Relations.

References

1. Decenzo, David A and Stephen P Robbins. *Human Resource Management (11/e)*. Wiley, 2013.
2. Dwivedi, R S. *A Text Book of Human Resource Management*. Vikas Publishing House, 2009.
3. Fisher, Cynthia D and Lyle F Schoenfeldt. *Human Resource Management (6/e)*. Cengage Learning, 2006.
4. Gomex-Mejia, Luis R, David B Balkin and Robert L Cardy. *Managing Human Resources*. Person/Prentice Hall, 2009.
5. Kandula, Srinivas R. *Human Resource Management in Practice with 300 Models, Techniques and Tools*. PHI Learning, 2009.
6. Kleiman, Lawrence S. *Human Resource Management: A Managerial Tool for Competitive Advantage*. Cengage Learning, 2009.
7. Ivancevich, John M. *Human Resource Management*. McGraw Hill, 2007.
8. Mamoria, C B and S V Gankar. *Personnel Management*. Himalaya Publishing House, 2009.
9. Pattanayak, Biswajeet. *Human Resource Management*. PHI Learning, 2005.
10. Rao, P Subha. *Essentials of Human Resource Management and Industrial Relations: (Text, Cases and Games)*. Himalayan Books, 2011.
11. Rao, V S P. *Human Resource Management*. Excel Books, 2010.
12. Sanghi, Seema. *Human Resource Management*. Vikas Publishing, 2014.
13. Snell, Scott, George Bohlander and Veena Vohra. *Human Resource Management: A South Asian Perspective*. Cengage Learning India, 2010.

COURSE PLAN

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Introduction: Evolution of HRM - Meaning and significance - differences between personnel management and HRM - Major functions of HRM - Line functions and staff functions - human capital management – Characteristics and qualities of HR Manager - Recent trends in HRM	6	10
II	Job Design, Work and Motivation - Job design and quality of work life, A conceptual model of job design, Job performance outcomes, Job analysis, Job designs: the result of job analysis. The way people perceive their jobs, Designing Job range: Job rotation and job Enlargement, Designing Job depth: Job enrichment and job design.	8	10
First Internal Examination			
II	Pre-recruitment functions: Organizational structure - Analysis and Designing of Jobs - HR planning - Factors affecting HR Planning - HRP process - Requisites of a good HRP - Barriers to HRP Recruitment, selection and appointment: Meaning and significance of recruitment - Process of recruitment -Sources of recruitment - Cost-benefit analysis of recruitment - Process of selection - Difference between recruitment and selection - Selection techniques: tests, interviews and salary negotiation - Meaning and significance of appointment - Process of appointment - Induction and Placement.	12	20
III	Training and development: Meaning and significance of training and development - Process of training development - Training Need Analysis - Training Design – Training Implementation - Training evaluation - Methods of training: on-the-job and off-the-job methods	6	10
Second Internal Examination			
IV	Performance Management: Meaning and significance of Performance Management - Types of performance appraisal system - Performance goal setting – Performance coaching and monitoring - Performance evaluation and performance feedback - Aligning performance outcome to career and succession planning Compensation and benefits: Meaning and significance - Components of Compensation - Factors affecting wages and salaries	7	10
V	Employee relations: Meaning and significance of employee relations - Employee relations in unionised and non-unionised organizations, participative management - Handling grievances, managing discipline, conducting domestic enquiry -	6	15
Trimester Examination		45	

Course No.	Course Name	L-T-P	Credits	Year of Introduction
38	Soft Skills III	0-2-0	3	2016

Course Objectives

The objective of this course is to enable students understand the importance communication in the corporate life via group discussions and live interviews. Be enabled to write technically adept resumes and cover letters. The course also aims to enable students to combat stress and manage and resolve possible conflicts.

Syllabus

Stress, Conflict management, Resume writing, Group Discussions, Interview skills

Expected Outcome

- Enhancement of the holistic development of students and improvement of their employability skills.
- To develop strategies to manage stress
- To develop methods or perspectives to resolve conflicts
- To have hands-on group discussion and interview exposure in a simulated corporate environment
- To develop adept resume writing skills

References

1. Bovee, Courtland, John Thill and Mukesh Chaturvedi. *Business Communication Today*. Pearson Education, 2009.
2. Monippally, Matthukutty M. *Business Communication Strategies*. Tata McGraw-Hill Publishing Company Ltd. 2001

Course Plan

Unit	Topics	Hours allotted	% of marks in Trimester Exam
I	Introduction to Stress Management - Eustress and Distress - Causes of Stress - Impact of Stress -Managing Stress	4	2
II	Conflict - Goal Conflict - Cognitive Conflict - Intrapersonal and Interpersonal Conflict - Conflict resolution	4	6
III	Resume vs CV vs Biodata writing - Cover letter writing	2	6
IV	Group Discussion - Do's and Don'ts - Interview Skills - Giving and taking Interviews	4	6
V	Hands-on experience of Giving and Taking Interviews	8	10



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Course No.	Course Name	L-T-P	Credits	Year of Introduction
52	Business Ethics and Corporate Governance	3-0-0	3	2016

Course Objectives

The basic objective of the course is to sensitise the student on the various ethical aspects concerning the functioning of business enterprises, and to provide awareness about, how the society and business are interdependent for the survival of both. The course aims to equip the students to be honest and be responsible to the society. The knowledge of the subject will improve ethical reasoning by correlating moral concepts to business practices. The course aims to create awareness among students on the importance of Corporate Governance.

Syllabus

Values and its transformation to Ethics – Business Ethics, Stakeholder approach – Law & Ethics – Ethical Philosophies – Ethical Dilemma – Whistle blowing – Corporate Ethics, Ethics Programme – Ethics in functional areas of business – Corporate Governance

Expected Outcome

On successful completion of the course, the student will be well aware that ethical decision making in business management is a must for any organisation for its long term survival and consistent growth. Knowledge on business ethics will motivate the Managers to be more transparent in their business dealings resulting in a business world with no scams and with most effective corporate governance.

References

1. Kumar Senthil, Rajan Senthil, *Business Ethics and Values*, Himalaya Publishing, Mumbai
2. William H Shaw, *Business Ethics: Text Book with Cases*, Cengage Learning 2014
3. Sekhar R.C, *Ethical Choice in Business*, Sage Publication
4. Biswanath Ghosh, *Ethics in Management and Indian Ethos*, 2009, Vikas Publishing.
5. Jennings M.Marianne, *Cases in Business Ethics*, 2008, Cengage Learning India Pvt Ltd, New Delhi.
6. Murthy.C.S.V, *Business Ethics – Text and Cases*, 2010, Himalaya Publishing, Mumbai.
7. Balachandran, and Chandrasekharan, *Corporate Governance, Ethics and Social Responsibility*, PHI, 2/e, 2011.

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COURSE PLAN		
Unit	Topics	% marks in Final Exam.
I	Values – intention – action – consequences, Ethics, Inventory of values, Business Ethics – Stakeholder Model of Business Ethics, Ethics and Religion – Sources of Morality – influences to ethical responses – Indian Work Ethics - Law and Ethics – relationship and comparison, Interdependence of Business & Society – Corporate Social Responsibility	20
2	Ethical Philosophies – Normative Ethics – Descriptive Ethics – Applied Ethics – Meta Ethics, Deontological ethics – Teleological Ethics – Virtue Ethics, Utilitarianism – Egoism – Divine Command – Immanuel Kant's Theory, Social Contract Theory, Moral Relativism	15
First Internal Examination		
3	Ethics in functional areas of business – Financial Management (Window dressing, misleading financial analysis, insider trading, churning etc.) – Human Resource Management – (Discrimination – age, gender, race) sexual harassment, ethics at work place, issues affecting privacy of employees, fairness of employment contracts, occupational safety– Marketing Management – Pricing issues like Price discrimination, Price fixing, Price skimming, Ethics in advertising (surrogate, deceptive advertising), Distribution issues like tying arrangement, black market– Production Management – Process issues like effluents, optimisation of resources like power & water, Product issues like additive & intrinsically hazardous products, genetically modified products, flawed products– Ethics in Information Technology – Ethics in customer and vendor relationship	20
Second Internal Examination		
4	Ethics Programme – code of ethics – ethics training – ethics committee – ethics officer, Ethics Audit, Transparency International - Whistle Blowing – classification – legal support to Whistle-Blower – Tips to successful Whistle Blowing - Corporate Governance - Definition - need for corporate governance - evidence of corporate governance from Arthashashtra - elements of good corporate governance - corporate governance theories - Agency Theory - Shareholder Theory - Stake Holder Theory - Stewardship Theory	20
5	Developments in corporate governance - evolution in US, UK and India – board effectiveness - issues and challenges - role and types of directors - corporate board committees - corporate disclosure - emerging trends in corporate governance - corporate board duties - responsibilities and liabilities. Legal framework for corporate governance Companies Act, Basel III	25
Final Exam		



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CODE	COURSE NAME	CATEGORY	L	T	P	CREDIT
MCN202	CONSTITUTION OF INDIA		2	0	0	NIL

Preamble:

The study of their own country constitution and studying the importance environment as well as understanding their own human rights help the students to concentrate on their day to day discipline. It also gives the knowledge and strength to face the society and people.

Prerequisite: Nil

Course Outcomes: After the completion of the course the student will be able to

CO 1	Explain the background of the present constitution of India and features.
CO 2	Utilize the fundamental rights and duties.
CO 3	Understand the working of the union executive, parliament and judiciary.
CO 4	Understand the working of the state executive, legislature and judiciary.
CO 5	Utilize the special provisions and statutory institutions.
CO 6	Show national and patriotic spirit as responsible citizens of the country

Mapping of course outcomes with program outcomes

	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO 1						2	2	2		2		
CO 2						3	3	3		3		
CO 3						3	2	3		3		
CO 4						3	2	3		3		
CO 5						3	2	3		3		
CO 6						3	3	3		2		

Assessment Pattern

Bloom's Category	Continuous Assessment Tests		End Semester Examination
	1	2	
Remember	20	20	40
Understand	20	20	40
Apply	10	10	20
Analyse			

Evaluate			
Create			

Mark distribution

Total Marks	CIE	ESE	ESE Duration
150	50	100	3 hours

Continuous Internal Evaluation Pattern:

Attendance	: 10 marks
Continuous Assessment Test (2 numbers)	: 25 marks
Assignment/Quiz/Course project	: 15 marks

End Semester Examination Pattern: There will be two parts; Part A and Part B. Part A contain 10 questions with 2 questions from each module, having 3 marks for each question. Students should answer all questions. Part B contains 2 questions from each module of which student should answer any one. Each question can have maximum 2 sub-divisions and carry 14 marks.

Course Level Assessment Questions

Course Outcome 1 (CO1):

- 1 Discuss the historical background of the Indian constitution.
- 2 Explain the salient features of the Indian constitution.
- 3 Discuss the importance of preamble in the implementation of constitution.

Course Outcome 2 (CO2)

- 1 What are fundamental rights ? Examine each of them.
- 2 Examine the scope of freedom of speech and expression underlying the constitution.
- 3 The thumb impression of an accused is taken by the police against his will. He contends that this is a violation of his rights under Art 20(3) of the constitution. Decide.

Course Outcome 3(CO3):

- 1 Explain the powers of the President to suspend the fundamental rights during emergency.

2 Explain the salient features of appeal by special leave.

3. List the constitutional powers of President.

Course Outcome 4 (CO4):

1 Discuss the constitutional powers of Governor.

2 Examine the writ jurisdiction of High court.

3 Discuss the qualification and disqualification of membership of state legislature.

Course Outcome 5 (CO5):

1 Discuss the duties and powers of comptroller of auditor general.

2 Discuss the proclamation of emergency.

3 A state levies tax on motor vehicles used in the state, for the purpose of maintaining roads in the state. X challenges the levy of the tax on the ground that it violates the freedom of interstate commerce guaranteed under Art 301. Decide.

Course Outcome 6 (CO6):

1 Explain the advantages of citizenship.

2 List the important principles contained in the directive principles of state policy.

3 Discuss the various aspects contained in the preamble of the constitution

Syllabus

Module 1 Definition, historical back ground, features, preamble, territory, citizenship.

Module 2 State, fundamental rights, directive principles, duties.

Module 3 The machinery of the union government.

Module 4 Government machinery in the states

Module 5 The federal system, Statutory Institutions, miscellaneous provisions.

Text Books

1 D D Basu, Introduction to the constitution of India, Lexis Nexis, New Delhi, 24e, 2019

2 PM Bhakshi, The constitution of India, Universal Law, 14e, 2017

Reference Books

1 Ministry of law and justice, The constitution of India, Govt of India, New Delhi, 2019.

2 JN Pandey, The constitutional law of India, Central Law agency, Allahabad, 51e, 2019

3 MV Pylee, India's Constitution, S Chand and company, New Delhi, 16e, 2016

Course Contents and Lecture Schedule

No	Topic	No. of Lectures
1	Module 1	
1.1	Definition of constitution, historical back ground, salient features of the constitution.	1
1.2	Preamble of the constitution, union and its territory.	1
1.3	Meaning of citizenship, types, termination of citizenship.	2
2	Module 2	
2.1	Definition of state, fundamental rights, general nature, classification, right to equality ,right to freedom , right against exploitation	2

2.2	Right to freedom of religion, cultural and educational rights, right to constitutional remedies. Protection in respect of conviction for offences.	2
2.3	Directive principles of state policy, classification of directives, fundamental duties.	2
3	Module 3	
3.1	The Union executive, the President, the vice President, the council of ministers, the Prime minister, Attorney-General, functions.	2
3.2	The parliament, composition, Rajya sabha, Lok sabha, qualification and disqualification of membership, functions of parliament.	2
3.3	Union judiciary, the supreme court, jurisdiction, appeal by special leave.	1
4	Module 4	
4.1	The State executive, the Governor, the council of ministers, the Chief minister, advocate general, union Territories.	2
4.2	The State Legislature, composition, qualification and disqualification of membership, functions.	2
4.3	The state judiciary, the high court, jurisdiction, writs jurisdiction.	1
5	Module 5	
5.1	Relations between the Union and the States, legislative relation, administrative relation, financial Relations, Inter State council, finance commission.	1
5.2	Emergency provision, freedom of trade commerce and inter course, comptroller and auditor general of India, public Services, public service commission, administrative Tribunals.	2
5.3	Official language, elections, special provisions relating to certain classes, amendment of the Constitution.	2