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1.3.2 During last five years, 127 value added courses were offered at the university level, which was open to all students across all programs. Out of these courses, ten (10) same name value-added courses were offered, which was already in curricula. Please see the below table in this regard.

1.3.2 Comparisons of similar value-added courses with the core and Discipline Specific courses

S. No.	Value added course details			Core/DSP course details		Remarks	Page No.
	Course Name	Course Code	Offering Department	Paper Code	Offering Department		
1	Intellectual Property Rights	CHV-0002	Institute of Applied Sciences	AGL-2206	Agriculture	Different Offering Departments	1 – 3
2	Cloud Computing	CSV-0006	Computer Engineering and Applications	B-070703T	Computer Engineering and Applications	Different Syllabus	4 – 6
3	Photography	JMV-0003	Journalism and Mass communication	VAL-4103	Visual and Performing Arts	Different offering Departments	7 – 9
4	Introduction to Mass Communication	EDV-0004	Institute of Education and Research	JML-1101	Journalism and Mass communication		10 – 12
5	Novel Drug Delivery Systems	PCV-0010	Pharmacy	BP-704T	Pharmacy	Different Syllabus	13 – 15
6	Standardization of Herbal Drugs	PCV-0004	Pharmacy	BP-806ET	Pharmacy		16 – 18

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7	Clinical Pharmacy and Drug Interactions	PCV-0006	Pharmacy	PHAR-802P(c)	Pharmacy	Core paper has been closed as per PCI	19 – 20
8	Cyber Security	CSV-0008	Computer Engineering and Applications	CSL-3106	Computer Engineering and Applications	Different Syllabus	21 – 22
9	Green Chemistry	CHV-0001	Institute of Applied Sciences	CHL-3233	Institute of Applied Sciences	Enrolled students were different	23 – 26
10	Solid Waste Management	CEA-0001	Civil Engineering	MEC-103	Civil Engineering	Different Syllabus	27 – 29

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Institute of Applied Sciences

Course Name: Intellectual Property Rights | **Total Contact Hours**
Course Code: CHV- 0002 | **30 Hours**

Course Objectives:
The main aim of this course is provide the knowledge to the students about various types of Intellectual Property Rights, Patentable Subject, History of Indian Patent Protection, Patent filing procedure in India, Opposition- pre-grant opposition and post-grant opposition, Patent filing procedure under PCT, advantages, patent search and literature and Salient features of Indian Patents, validation process in India etc.

Course Outcome: The clear information about the patent laws, intellectual property rights and drug regulation in India and abroad is gained by the students.

UNIT – I **6 Hours**

Introduction, Types of Intellectual Property Rights (Patents, Trademarks, Copyrights, Geographical Indications Industrial Designs and Trade secrets), Patentable Subject Matter (Novelty, Non Obviousness, Utility, enablement and Best mode).

UNIT – II **6 Hours**

- History of Indian Patent Protection, Rationale behind Patent System, Objectives and Advantages of Patent System, and future challenges. Indian Patents Act 1970, Definitions and Key Terminology, Types of Patent applications, Inventions not patentable (section 3 and 4).
- Patent filing procedure in India (Patent Prosecution), Specifications (Provisional and Complete), Claims- types of claims and legal importance of claims, Grant of patent, Rights of Patentee and co-owners
- Opposition- pre-grant opposition and post-grant opposition, Anticipation, Infringement, Compulsory Licensing, revocation of patents, and power of Controller
- Patent filing procedure under PCT, advantages, patent search and literature

Unit – III **6 Hours**

- Salient features of Indian Patents (Amendments) Act 1999, 2002 and 2005. US and European Patent System.
- Background, Salient Features and Impact of International Treaties / Conventions like

1. Paris Convention, Berne convention
2. World Trade Organization (WTO)
3. World Intellectual Property Organization (WIPO)
4. Trade Related Aspects of Intellectual Property Rights (TRIPS)
5. Patent Co-operation Treaty (PCT), Madrid Protocol

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Mangalayatan University
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Unit – IV **6 Hours**

1. PCT Application procedure and review procedure
2. National phase application procedure for US& EU
3. Patent prosecution procedure in US and EU
4. WIPO and its role in IPR
5. Hatch- Waxman provision for IPR

Unit – V **6 Hours**

1. Patent in validation process in India, US and Europe
2. IPR related to copyright, trade mark, trade secret and geographical indication.
3. Patent application writing
4. Claim construction and claims.

Recommended Books:

1. Research Methodology concepts and cases by Depak Chawla, Neena Sondhi
2. Draft manual of Patent Practice and Procedure -2008 , The Patent Office, India
3. Manual of Patent Office Practice and Procedure -2010
4. Original Laws Published by Govt. of India
5. Protection of Industrial Property rights by P. Das and Gokul Das
6. Law and Drugs, Law Publications by S. N. Katju
7. Laws of drugs in India, Hussain
8. New drug approval process, 5th edition, by Guarino
9. Commercial Manual on Drugs and Cosmetics 2004, 2nd edition
10. Drugs and Cosmetics act by Vijay Malik
11. Good Manufacturing Practices for Pharmaceuticals. S.H. Wiling, Vol. 78, Marcel Decker.
12. fda.org,wipo.int,patentlawlinks.com, hc-sc.gc.ca,ich.org,cder.org
13. Current good manufacturing practices for pharmaceuticals by Manohar A. Potdar
14. Pharmaceutical Regulatory affairs –selected topics. CVS subhramanyam and J Thimma settee. Delhi. Vallabha Prakasham, 2012

14-1-22

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Intellectual Property Rights (Theory)

Subject Code: AGL-2206

L	T	P	C
1	0	0	1

Objective: The main objective of this course is to equip students and stakeholders with knowledge of intellectual property rights (IPR) related protection systems, their significance and use of IPR as a tool for wealth and value creation in a knowledge-based economy.

Course Outcomes

COs No.	Course Outcomes (COs)	Cognitive Level
1.	**Explain** intellectual property	Understand
2.	**Importance of** Patent	Remember
3.	**Classify** Patent system in India	Understand
4.	**Identify** Plant breeders' rights	Apply
5.	**Explain** Convention on Biological Diversity	Understand

Theory

Unit I: Introduction and meaning of intellectual property. Brief introduction to GATT, WTO, TRIPs and WIPO Treaties for IPR protection: Madrid protocol, Berne Convention, Budapest treaty, etc.

Unit II: Types of Intellectual Property and legislations covering IPR in India: Patents, Copyrights, Trademark, Industrial design, Geographical indications, Integrated circuits, Trade secrets.

Unit III: Patents Act 1970 and Patent system in India, patentability, process and product patent, filing of patent, patent specification, patent claims, Patent opposition and revocation, infringement, Compulsory licensing, Patent Cooperation Treaty, Patent search and patent database; Origin and history including a brief introduction to UPOV for protection of plant varieties; Protection of plant varieties under UPOV and PPV&FR Act of India;

Unit IV: Plant breeders rights; Registration of plant varieties under PPV&FR Act 2001; breeders, researcher and farmers rights. Traditional knowledge-meaning and rights of TK holders.

Unit V: Convention on Biological Diversity; International treaty on plant genetic resources for food and agriculture (ITPGRFA). Indian Biological Diversity Act, 2002 and its salient features, access and benefit sharing.

References:

1. Acharya, N.K. 2014. *Text book of Intellectual Property Rights*. Asia Law House, Hyderabad.
2. Loganathan, E.T. 2012. *Intellectual Property Rights*. New Century Publications, New Delhi.

2020-21

Value Added Course
Department: Computer Science Engineering

Course Name: Cloud Computing | **Total Contact Hours**
Course Code: CSV- 0006 | **30Hours**

Unit-I Introduction- Objectives. From collaborative to the Cloud – A short history Client – Server Computing, Peer-to-Peer Computing, Distributed Computing, Collaborative Computing, Cloud Computing, Functioning of Cloud Computing, Cloud Architecture, Cloud Storage, Cloud Services, Industrial Applications.

Unit-II Business Values, Introduction-Objectives, Service Modeling, Infrastructure Services, Platform Services, Software Services - Software as service modes- Massively scaled software as a service- Scale of Economy, Management and Administration.

Unit-III Inside Cloud Computing- Introduction- Objectives, Feeling Sensational about Organization, Making Strategy Decisions- Governance Issues- Monitoring Business Processes- IT Cost Management.

Unit- IV Cloud Service Administration- Service Level Agreements and Monitoring-Support Services- Accounting Services, Resource Management- IT Security- Performance Management- Provisioning- Service Management, Untangling Software Dependencies.

Unit- V Cloud Computing Technology- Introduction-Objectives, Clients – Mobile – Thin – Thick, Security - Data Linkage - Offloading Work - Logging - Forensics - Development – Auditing, Network- Basic Public Internet- The Accelerated Internet- Optimised Internet Overlay- Site-to-Site VPN- Cloud Providers- Cloud Consumers - Pipe Size- Redundancy, Services- Identity- Integration- Mapping- Payments- Search.

14-1-22

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Paper Code: B-070703T | **L** | **T** | **P** | **C**
Paper Name: Cloud Computing | **3** | **1** | **0** | **4**

S. No.	Course Outcomes (COs)	Cognitive Level
1	Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing.	Knowledge, Understand
2	Apply the fundamental concepts in datacenters to understand the tradeoffs in power, efficiency and cost.	Apply, Create
3	Identify resource management fundamentals, i.e. resource abstraction, sharing and sandboxing and outline their role in managing infrastructure in cloud computing.	Analyze
4	Analyze various cloud programming models and apply them to solve problems on the cloud.	Analyze

UNIT I:
Introduction: Network centric computing, Network centric content, peer-to –peer systems, cloud computing delivery models and services, Ethical issues, Vulnerabilities, Major challenges for cloud computing. Parallel and Distributed Systems: introduction, architecture, distributed systems, communication protocols, logical clocks, message delivery rules, concurrency, and model concurrency with Petri Nets.

UNIT II:
Cloud Infrastructure: At Amazon, The Google Perspective, Microsoft Windows Azure, Open Source Software Platforms, Cloud storage diversity, Inter cloud, energy use and ecological impact, responsibility sharing, user experience, Software licensing, Cloud Computing : Applications and Paradigms: Challenges for cloud, existing cloud applications and new opportunities, architectural styles, workflows, The Zookeeper, The Map Reduce Program model, HPC on cloud, biological research

UNIT III:
Cloud Resource virtualization: Virtualization, layering and virtualization, virtual machine monitors, virtual machines, virtualization- full and para, performance and security isolation, hardware support for virtualization, Case Study: Xen, vBlades, Cloud Resource Management and Scheduling: Policies and Mechanisms, Applications of control theory to task scheduling, Stability of a two-level resource allocation architecture, feedback control based on dynamic thresholds, coordination, resource bundling, scheduling algorithms, fair queuing, start time fair queuing, cloud scheduling subject to deadlines, Scheduling Map Reduce applications, Resource management and dynamic application scaling

UNIT IV:
Storage Systems: Evolution of storage technology, storage models, file systems and database, distributed file systems, general parallel file systems. Google file system. Apache Hadoop, Big Table, Megastore (text book 1), Amazon Simple Storage Service(S3) (Text book 2), Cloud Security: Cloud security risks, security – a top concern for cloud users, privacy and privacy impact assessment, trust, OS security, Virtual machine security, Security risks

UNIT V:

Cloud Application Development: Amazon Web Services : EC2 – instances, connecting clients, security rules, launching, usage of S3 in Java, Installing Simple Notification Service on Ubuntu 10.04, Installing Hadoop on Eclipse, Cloud based simulation of a Distributed trust algorithm, Cloud service for adaptive data streaming (Text Book 1), Google: Google App Engine, Google Web Toolkit (Text Book 2), Microsoft: Azure Services Platform, Windows live, Exchange Online, Share Point Services, Microsoft Dynamics CRM (Text Book 2)

Text Books:

1. Cloud Computing, Theory and Practice, Dan C Marinescu, MK Elsevier
2. Cloud Computing, A Practical Approach, Anthony T Velte, Toby J Velte, Robert Elsenpeter, TMH

Reference book:

1. Mastering Cloud Computing, Foundations and Application Programming, Raj Kumar Buyya, Christen vecctiola, S Tammarai selvi, TMH

Department Journalism & Mass Communication

Course Name- Photography | **Total Contact Hours**
CourseCode:JMV-0003 | **30 Hours**

Objectives :

1- Students will be able to shoot quality photos.
2- Students will be able to understand the concept of different angles.
3- Students will be able to know technical tools of camera.
4- Students will be able to operate camera and also know lenses, lights.

Unit-I

Concepts of digital photography, Aesthetics of Photography, Technical of photography, Manual photography, Aperture, Shutter Speed, ISO, Understanding exposure, Concepts of framing, Rules of photography, Types of photography, Light, Tools of photography, Photo journalism, Photoshop, Production – Photo feature and Photo-essay.

Unit-II

Introduction to video camera, Parts of video camera and their functions, Camera movement equipment, Lenses – functions and types.

Unit-III

Composition – different types of shots, camera angles and camera movements,Aesthetics in visual composition, Subject - camera relationship Aperture control and depth of field.

Unit-IV

Lights and its properties, Different types of lights, Other tools used in lighting – diffusers, reflectors, cutters & gels, Basic lighting techniques, Accessories used in lighting.

Unit-V

Audio fundamentals, Various audio elements used in video programmers – lip, synchronized sound, voice, music, ambience, sound effects, Types of microphones, Use of audio mixers for recording & editing of sound, Different audio equipment for studio and location recording, Audio post production – mix and un-mix tracks.

Teaching Hours-30

UNIT-1 -5 Hrs.

1 Hour- Concepts of digital photography, Aesthetics of Photography, Technical of photography, Manual photography,
2 Hour-Aperture, Shutter Speed, ISO, Understanding exposure, Concepts of framing, Rules of photography, Types of photography,
2-Hour-Light, Tools of photography, Photo journalism, Photoshop, Production – Photo feature and Photo-essay.

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Mangalayatan University
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UNIT-2, 3-10 Hrs. .

2 Hour- Introduction to video camera, Parts of video camera and their functions,

3 Hour- Camera movement equipment, Lenses – functions and types.

2 Hour- Composition – different types of shots, camera angles and camera movements,

3 Hour- Aesthetics in visual composition, Subject - camera relationship Aperture control and depth of field.

UNIT-4, 5-7 Hrs.

2 Hour- Lights and its properties, Different types of lights, other tools used in lighting – diffusers

2 Hour- reflectors, cutters & gels, Basic lighting techniques, Accessories used in lighting.

1 Hour- Audio fundamentals, various audio elements used in video programmers

2 Hour- lip, synchronized sound, voice, music, ambience, sound effects, Types of microphones,

UNIT-5-8 Hrs.

2 Hour- Use of audio mixers for recording & editing of sound

2 Hour- Different audio equipment for studio and location recording,

2 Hour- Audio post production

2 Hour- mix and un-mix tracks.

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Paper Code: VAL-4103/VAP-4103 **L T P C**
Paper:Photography **2 0 4 4**

Objectives of the Course

The student will be able to-

1. Learn the finer points of photography.
2. Inter weave the camera handling skills; technology and techniques.
3. Learn about various types of cameras, photography equipments and techniques from historical perspective.
4. Learn to shoot great images, understand concept of framing and composition from artistic and communicative point of view.

Unit –I Camera as a Tool: Evolution of camera. Camera technology. Film formats. Camera design. Optical lenses, accessories.

Unit -II Camera Techniques - Observation, Selection of subject: Observing light, light temperature. Selection of subject.Exposures, apertures. Choice of lens, filters. Choice of shot.

Unit –III Know your digital Camera: Camera Parts. Body.Sensor/lenses/digital technology/CPU.

Unit –IV Automated and Assisted settings: Shooting modes. Flash Modes.Image enhancement settings. Videomode. Manual Settings. Automated and Assisted settings: Shooting modes. Flash Modes. Image enhancement settings. Videomode. Manual Settings. Shoot with different Automated modes.

Shoot with manual settings. Shoot with different lenses. Shoot with Flash. Shoot with natural light. Shoot with filters.

20 Assignments Submission: End of the Semester

Reference Books:

1. Chris Gatcum,The Beginner's Photography Guide
2. Tom Ang, How to Photograph Absolutely Everything

Value Added Course Syllabus

Introduction to Mass Communication

Subject Code: EDV-0004

L	T	P	C
2	0	0	0

Objectives

After studying this course the students shall be able to:

1. understand the importance, functions & scope of communication and media.

2. describe the growth and development of communication and media.

3. understand the periodic changes in the media.

OUTCOMES

S.No.	Course Outcomes	Level
1	understand the importance, functions & scope of communication and media.	Comprehension
2	describe the growth and development of communication and media.	Comprehension
3	understand the periodic changes in the media.	Comprehension

Unit-I Communication & Media

Communication & Media: Definition, meaning & concept. 2. Different types of communication: Verbal and written 3. Scope and Process of Communication 4. Mass Communication: Concept & Characteristics

Unit-II History of Mass Media

Mass Media: Meaning & Concept 2. Introduction to Indian Press 3. Brief account of the origin and development of newspaper and magazine in India 4. History of the development of electronic media in India: Radio & TV

Unit-III Mass media & Mass Culture

Role, objectives functions & achievements of Mass Media 2. Relation between Mass Media and Mass Culture and their development. 3. Media as fourth pillar of democracy 4. Mass Media in Rural-Urban divide.

Unit-IV Media, Market and Technology

19-1-22

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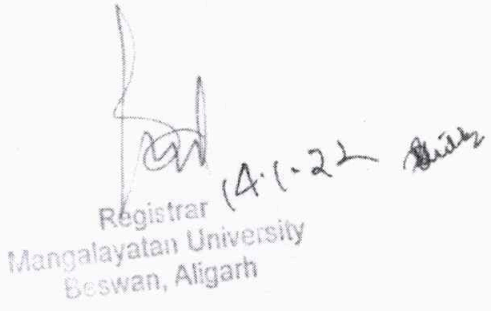
Changing trends of Mass Communication under the process of globalization 2. Private and Public Media 3. Technology in the development of Media 4. Media and Market: Nature, Relation & Expansion

Suggested Readings:

1. Kumar, Kewal J Mass Communication in India, Jaico Books, New Delhi,

2. J.S. Yadava & Pradeep Mathur Issues in Mass Communication: The Basic Concepts, Kanishka Publishers. Delhi, 2008

3. Shymali Bhattachariee.. Media and Mass Communication



BA (Mass Communication), 2020-23batch
Semester-1st

Subject Code: JML-1101	**L**	**T**	**P**	**C**
Subject Name: Introduction to Mass Communication	**3**	**1**	**0**	**4**

At the end of the Introduction to Mass Communication course, student will be able to:

COs No.	Course Outcomes (COs)	Cognitive Level
1.	**Define** the basics of Mass Communication.	Remember
2.	**Diffrentiate** the influence of individual & Selective theory and social responsibilities.	Understand
3.	**Classify** the definition and types of Mass Communication.	Apply
4.	**Demonstrate** skills of communication and in society.	Apply
5.	**Explain** the impact of Mass Communication in the society and audience.	Understand
6.	**Describe** the types of audeinece and limiations of Mass Communication.	Understand

Unit-I Introduction to Mass Communication
Communication: concept, definitions and types, Mass Communication, Elements of Mass Communication, Functions of Mass Communication, Media of Mass Communication. Development of Mass Communication in India

Unit-II Models of communication
Laswell, Osgood, Shanon and Weaver, Wilbur Shramm, George Gerbner, Westley and Maclean Model.

Unit-III Theories of communication
Bullet Theory, Individual difference theory, personal influence theory,Selective Theory Agenda setting theory, Uses and Gratification theory, social responsibility theory.

Unit-IV Effects of Mass Media
Effects of Mass Communication, Mass communication as an agent of Social change Demassification, Demystification, Decentralization and convergence Characteristics of AudiencesType of audiences: Elite audience, General audience, specialized audience Limitations of Mass Communication.

References:

1. Mass-Communication in India: Kevel J. Kumar: Jaico Mumbai
2. Mass-Communication theory-An Introduction: Denis McQuail: Sage Delhi
3. Bharat Men Sanchar aurJansanchar: J.V.Vilanilam: M.P. Hindi Granth Academy Bhopal
4. Mass-Communication: Concepts and issues: D.V.R Murthy: Olive green: Kochi
5. Mass-, Culture, Language and arts in India: Mahadev L. Apte: Popular Prakashan Mumbai
6. Towards sociology of Mass-Communication: Denis McQuail: Collier –Macmillan
7. Introduction to Communication Studies: John Fiske: Methuen London

Course Name: NOVEL DRUG DELIVERY SYSTEMS **Total Contact Hours**
Course Code: PCV- 0010 **30Hours**

Unit I Sustained Release (SR) and Controlled Release (CR) formulations: Introduction & basic concepts, advantages/ disadvantages, factors influencing. Physicochemical & biological approaches for SR/CR formulation. Mechanism of Drug Delivery from SR/CR formulation. Polymers: introduction, definition, classification, properties and application Dosage Forms for Personalized Medicine: Customized drug delivery systems.

Unit II Rate of Controlled Drug Delivery Systems: Principles & Fundamentals, Types, Activation; Modulated Drug Delivery Systems: Mechanically activated, pH activated, Enzyme activated, and Osmotic activated Drug Delivery Systems .

Unit III **Gastro-Retentive Drug Delivery Systems:** Principle, concepts advantages and disadvantages, Modulation of GI transit time approaches to extend GI transit. Buccal Drug Delivery Systems. Principle of mucoadhesion, advantages and disadvantages, Mechanism of drug permeation, Methods of formulation and its evaluations.

Unit IV **Ocular Drug Delivery Systems:** Barriers of drug permeation, Methods to overcome barriers.

Vaccine delivery systems: Vaccines, uptake of antigens, single shot vaccines, mucosal and transdermal delivery of vaccines.

Unit V **Tran dermal Drug Delivery Systems:** Structure of skin and barriers, Penetration enhancers, Tran dermal Drug Delivery Systems, Formulation and evaluation.

Protein and Peptide Delivery: Barriers for protein delivery. Formulation and Evaluation of delivery systems of proteins and other macromolecules.

Recommended Books:

1. Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992.
2. Robinson, J. R., Lee V. H. L, Controlled Drug Delivery Systems, Marcel Dekker,Inc., New York, 1992
3. Encyclopedia of controlled delivery, Editor- Edith Mathiowitz, Published by WileyInterscience Publication, John Wiley and Sons, Inc, New York! Chichester/Weinheim
4. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (reprint in 2001).
5. S.P.Vyas and R.K.Khar, Controlled Drug Delivery - concepts and advances, VallabhPrakashan, New Delhi, First edition 2002

14.1.22

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BP 704T: NOVEL DRUG DELIVERY SYSTEMS (Theory)

45 Hours

Scope: This subject is designed to impart basic knowledge on the area of novel drug delivery systems.

Objectives: Upon completion of the course student shall be able

1. To understand various approaches for development of novel drug delivery systems.
2. To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation

Course content:

Unit-I **10 Hours**

Controlled drug delivery systems: Introduction, terminology/definitions and rationale, advantages, disadvantages, selection of drug candidates.Approaches to design controlled release formulations based on diffusion, dissolution and ion exchange principles. Physicochemical and biological properties of drugs relevant to controlled release formulations

Polymers: Introduction, classification, properties, advantages and application of polymers in formulation of controlled release drug delivery systems.

Unit-II **10 Hours**

Microencapsulation: Definition, advantages and disadvantages, microspheres /microcapsules, microparticles, methods of microencapsulation, applications

Mucosal Drug Delivery system: Introduction, Principles of bioadhesion / mucoadhesion, concepts, advantages and disadvantages, transmucosal permeability and formulation considerations of buccal delivery systems

Implantable Drug Delivery Systems: Introduction, advantages and disadvantages, concept of implantsand osmotic pump

Unit-III **10 Hours**

Transdermal Drug Delivery Systems: Introduction, Permeation through skin, factors affecting permeation, permeation enhancers, basic components of TDDS, formulation approaches

Gastroretentive drug delivery systems: Introduction, advantages, disadvantages, approaches for GRDDS – Floating, high density systems, inflatable and gastroadhesive systems and their applications

Nasopulmonary drug delivery system: Introduction to Nasal and Pulmonary routes of drug delivery, Formulation of Inhalers (dry powder and metered dose), nasal sprays, nebulizers

Unit-IV **08 Hours**

Targeted drug Delivery: Concepts and approaches advantages and disadvantages, introduction to liposomes, niosomes, nanoparticles, monoclonal antibodies and their applications

Unit-V **07 Hours**

Ocular Drug Delivery Systems: Introduction, intra ocular barriers and methods to overcome –Preliminary study, ocular formulations and ocuserts

Intrauterine Drug Delivery Systems: Introduction, advantages and disadvantages, development of intra uterine devices (IUDs) and applications

Recommended Books: (Latest Editions)

1. Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992.
2. Robinson, J. R., Lee V. H. L, Controlled Drug Delivery Systems, Marcel Dekker, Inc., New York, 1992.
3. Encyclopedia of Controlled Delivery. Edith Mathiowitz, Published by Wiley Interscience Publication, John Wiley and Sons, Inc, New York. Chichester/Weinheim
4. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (reprint in 2001).
5. S.P. Vyas and R.K. Khar, Controlled Drug Delivery -concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002.

Journals

1. Indian Journal of Pharmaceutical Sciences (IPA)
2. Indian Drugs (IDMA)
3. Journal of Controlled Release (Elsevier Sciences)
4. Drug Development and Industrial Pharmacy (Marcel & Decker)
5. International Journal of Pharmaceutics (Elsevier Sciences)

Department: Pharmacy

Course Name: Standardization Of Herbal Drugs **Total Contact Hours**
Course Code: PCV- 0004 **30Hours**

Course Objectives:

1. To impart knowledge, develop skills to the students in pharmaceutical science with a trust herbal formulation and standardization of herbal drugs.
2. To develop the methods for selection of herbal materials and methods of screening of natural products for biological activity.
3. To determine the methods for identification and authentication of herbal materials.
4. Examine the methods of extraction and modern techniques.
5. Identification of various official formulations like ayurvedic preparations etc.

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

6 Hours

Unit -I Commerce and quality control of natural medicinal plants products, organoleptic, microscopical, physical & chemical evaluation of crude drugs.

6 Hours

Unit-II Standardization of plant material as per WHO guidelines.

6 Hours

Unit-III Methods of extraction and modern techniques for the isolation, purification, separation estimation and characterization of active plant constituents.

6 Hours

Unit-IV Analysis of official formulations derived from crude drugs including some ayurvedic preparations.

6 Hours

Unit-V General methods of screening of natural products for following biological activity:
a) Anti-inflammatory b) Hypoglycemic c) Antibacterial d) Ant fertility e)Psychopharmacological

Recommended Books:

1. Trease, G.E. Evans W.C., Pharmacognosy, ELBS
2. Tyler Varro. E., Brady Lynn. R. Robbers J.E. Pharmacognosy
3. Wallis T.E..Text book of Pharmacognosy
4. Harborne Phytochemical methods of chemical analysis .
5. Pharmacoepial standards for Ayurvedic formulations CCRAS, Delhi.
6. Vapoorte, Swendson Chromatography of alkaloids.
7. Lala P.K., Elements of chramatography
8. Mottal.A.C. Clerk's isolation & identifications of drugs
9. Dhavan B.N. & Srimal R.C, The use of pharmacological techniques for evaluation of natural products. CDRI Lucknow.
10. Brain K.R. and Turner T.D. The practical evaluation of phytopharmaceuticals
11. Peach K. & Tracey MV, Modern methods of plant analysis
12. British herbal phamacopocia.
13. Indian herbal pharmacopocia.
14. Chaudhary.R.R., Herbal drug industry

14-01-22
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BP 806 ET. QUALITY CONTROL AND STANDARDIZATION OF HERBALS (Theory)

Scope: In this subject the student learns about the various methods and guidelines for evaluation and standardization of herbs and herbal drugs. The subject also provides an opportunity for the student to learn cGMP, GAP and GLP in traditional system of medicines.

Objectives: Upon completion of the subject student shall be able to;

1. know WHO guidelines for quality control of herbal drugs
2. know Quality assurance in herbal drug industry
3. know the regulatory approval process and their registration in Indian and international markets
4. appreciate EU and ICH guidelines for quality control of herbal drugs

Unit I **10 hours**

Basic tests for drugs – Pharmaceutical substances, Medicinal plants materials and dosage forms

WHO guidelines for quality control of herbal drugs.

Evaluation of commercial crude drugs intended for use

Unit II **10 hours**

Quality assurance in herbal drug industry of cGMP, GAP, GMP and GLP in traditional system of medicine.

WHO Guidelines on current good manufacturing Practices (cGMP) for Herbal Medicines

WHO Guidelines on GACP for Medicinal Plants.

Unit III **10 hours**

EU and ICH guidelines for quality control of herbal drugs.

Research Guidelines for Evaluating the Safety and Efficacy of Herbal Medicines

Unit IV **08 hours**

Stability testing of herbal medicines.Application of various chromatographic techniques in standardization of herbal products.

Preparation of documents for new drug application and export registration

GMP requirements and Drugs & Cosmetics Act provisions.

Unit V **07 hours**

Regulatory requirements for herbal medicines.

WHO guidelines on safety monitoring of herbal medicines in pharmacovigilance systems

Comparison of various Herbal Pharmacopoeias.

Role of chemical and biological markers in standardization of herbal products

Recommended Books: (Latest Editions

1. Pharmacognosy by Trease and Evans
2. Pharmacognosy by Kokate, Purohit and Gokhale
3. Rangari, V.D., Text book of Pharmacognosy and Phytochemistry Vol. I , Carrier Pub., 2006.
4. Aggrawal, S.S., Herbal Drug Technology. Universities Press, 2002.
5. EMEA. Guidelines on Quality of Herbal Medicinal Products/Traditional Medicinal Products,
6. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002.
7. Shinde M.V., Dhalwal K., Potdar K., Mahadik K. Application of quality control principles to herbal drugs. International Journal of Phytomedicine 1(2009); p. 4-8.
8. WHO. Quality Control Methods for Medicinal Plant Materials, World Health Organization, Geneva, 1998. WHO. Guidelines for the Appropriate Use of Herbal Medicines. WHO Regional Publications, Western Pacific Series No 3, WHO Regional office for the Western Pacific, Manila, 1998.
9. WHO. The International Pharmacopeia, Vol. 2: Quality Specifications, 3rd edn. World Health Organization, Geneva, 1981.
10. WHO. Quality Control Methods for Medicinal Plant Materials. World Health Organization, Geneva, 1999.
11. WHO. WHO Global Atlas of Traditional, Complementary and Alternative Medicine. 2 vol. set. Vol. 1 contains text and Vol. 2, maps. World Health Organization, Geneva, 2005.
12. WHO. Guidelines on Good Agricultural and Collection Practices (GACP) for Medicinal Plants. World Health Organization, Geneva, 2004.

Department: Pharmacy

Course Name- Clinical Pharmacy & Drug Interactions **Total Contact Hours**
Course Code - PCV- 0006 **30Hours**

Course Objectives:

1. To impart knowledge of clinical pharmacy & drug interactions to make student aware of strategies for effective treatment of patient.
2. To develop understanding of the clinical investigation data and its interpretation to design compliable optimal drug regimen with minimal adverse effects and interactions with maximum therapeutic outcome.
3. To conduct clinical trials, data handling and role of biostatistician.

Unit -I Introduction to clinical pharmacy **6 Hours**

Definition, development and scope of clinical pharmacy, Variability in human response to drugs and influence of disease processes. Drug handling and prescribing in the elderly, infants and children. Drug usage in pregnancy and in breast-feeding women. Prescribing for patients with renal or hepatic disease, Pharmacoepidemiology.

Unit- II Data analysis and compiling **6 Hours**

The patient's case history, communication skills including patient medication history interview, patient counseling, Medical writing: Regulatory and educational medical writing. Pharmaco vigilance programme of India (PvPI) and Geneva (UPSALA).

Unit- III Daily activities of clinical pharmacists **6 Hours**

Drug therapy monitoring (medication chart view, clinical review), therapeutic drug monitoring, ward round participation, drug utilization evaluation/ review (DUE)/ (DUR), Quality assurance of clinical pharmacy services.

Unit -IV Research design and conduct of clinical trials **6 Hours**

Research support including planning and execution of clinical trials. Schedule Y, GLP, GCP and ICH Guidelines, trial master file and ethical requirements. Various phases of clinical trials. Categories of Phase IV studies.

Unit -V Data collection and biostatistical analysis **6 Hours**

Statistical principles underlying clinical trials, data handling and role of biostatistician.

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Recommended Book:

1. Merchant S.H. and Dr. J.S.Quadry. A textbook of hospital pharmacy, 4th ed. Ahmadabad: B.S. Shah Prakakshan; 2001.
2. Parthasarathi G, Karin Nyfort-Hansen, Milap C Nahata. A textbook of Clinical Pharmacy Practice- essential concepts and skills, 1st ed. Chennai: Orient Longman Private Limited; 2004.
3. William E. Hassan. Hospital pharmacy, 5th ed. Philadelphia: Lea & Febiger; 1986.
4. Tipnis Bajaj. Hospital Pharmacy, 1st ed. Maharashtra: Career Publications; 2008.
5. Thomas Dixon "Clinical Pharmacy Education Practice and Research" –Elsevier.
6. Li. Albert Drug-Drug Interactions: Scientific and Regulatory Perspectives, Volume 43, 1st Edition, –Elsevier.
7. Gupta S.K. "Basic Principles of Clinical Research and Methodology", Institute of Clinical Research (India), Published by Jaypee Brothers medical publisher (P) Ltd. New Delhi.

11-01-22

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Department: Computer Science Engineering

Course Name: Cyber Security | **Total Contact Hours**
Course Code: CSV- 0008 | **30Hours**

Unit –I Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats:- Cyber Warfare-Cyber Crime-Cyber terrorism-Cyber Espionage, Need for a Comprehensive Cyber Security Policy, Need for a Nodal Authority, Need for an International convention on Cyberspace.

Unit -II

Cyber Security Vulnerabilities-Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, Poor Cyber Security Awareness. Cyber Security Safeguards- Overview, Access control, Audit.

Unit- III

Introduction, Basic security for HTTP Applications and Services, Basic Security for SOAP Services, Identity Management and Web Services, Authorization Patterns, Security Considérations, Challenges.

Unit- IV

Intrusion, Physical Theft, Abuse of Privileges, Unauthorized Access by Outsider, Malware infection, Intrusion detection and Prevention Techniques, Anti-Malware software, Network based Intrusion detection Systems, Network based Intrusion Prevention Systems, Host based Intrusion prevention Systems, Security Information Management, Network Session Analysis, System Integrity Validation.

Unit- V

Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography. Overview of Firewalls- Types of Firewalls, User Management, VPN Security Security Protocols: - security at the Application Layer- PGP and S/MIME, Security at Transport Layer- SSL and TLS, Security at Network Layer-IPSec.

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Paper Code: CSL-3106 | **L** | **T** | **P** | **C**
Paper Name: Cryptography and Cyber security | **3** | **0** | **0** | **3**

S. No.	Course Outcomes (COs)	Cognitive Level
1.	Describe various encryption techniques.	Understand
2.	Express concept of Public key cryptography.	Understand
3.	Explain authentication and hash algorithms.	Understand
4.	Explain the symmetric encryption techniques	Understand
5.	Construct intrusion detection and its solutions to overcome the attacks.	Apply

Unit – I: Conventional Encryption

Introduction to security attacks, services and mechanism, introduction to cryptography.
Convention Encryption: Conventional Encryption Model, Steganography, Classical Encryption Techniques, Simplified DES, Block Cipher Principles, The Data Encryption Standard, The Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of operation,

Unit-II: Principals of public key crypto systems

RSA algorithm, security of RSA, key management, Diffle - Hellman key exchange algorithm,

Unit-III: Message Authentication and Authentication Applications

Authentication requirements, authentication functions, message authentication code, hash functions, birthday attacks, security of hash functions and MACS
Digital Signatures: Digital Signatures, authentication protocols, digital signature standards (DSS), proof of digital signature algorithm.
Kerberos and X.509, directory authentication service, electronic mail security-pretty good privacy (PGP), S/MIME.

Unit-IV: IP Security

Architecture, Authentication header, Encapsulating security payloads,combining security associations, key management. Web Security: Secure socket layer and transport layer security, secure electronic transaction (SET).

Unit-V: Cyber law & security

Basic Principles of Information Security, Confidentiality, Integrity Availability and other terms in Information Security, Information Classification and their Roles.
Security metrics- Classification and their benefits, Information Security & Law, IPR, Patent Law, Copyright Law, Legal Issues in Data mining, Security, Building Security into Software Life Cycle. Ethics- Ethical Issues, Issues in Data and Software Privacy, Cyber Crime Types & overview of Cyber Crimes

Books Recommended/Suggested Reading:

1. William Stallings, "Cryptography and Network Security: Principals and Practice", Prentice Hall, New Jersy.
2. Sood,"Cyber Laws Simplified", Mc Graw Hill
3. Merkov, Breithaupt," Information Security", Pearson Education Godbole," Information Systems Security", Willey

2020-21

Value Added Course

Institute of Applied Sciences

Course Name: Green Chemistry | **Total Contact Hours**
Course Code: CHV–0001 | **30 Hours**

At the completion of course Green Chemistry, student will be able to

Introduction to Green Chemistry

What is Green Chemistry? Need for Green Chemistry. Goals of Green Chemistry. Limitations/ Obstacles in the pursuit of the goals of Green Chemistry

Principles of Green Chemistry and Designing a Chemical synthesis

Twelve principles of Green Chemistry with their explanations and examples and special emphasis on the following:

- Designing a Green Synthesis using these principles: Prevention of Waste/ byproducts; maximum incorporation of the materials used in the process into the final products. Atom Economy, calculation of atom economy of the rearrangement, addition, substitution and elimination reactions.
- Green solvents – supercritical fluids, water as a solvent for organic reactions, ionic liquids, fluorous biphasic solvent, PEG, solvent less processes, immobilized solvents and how to compare greenness of solvents.
- Energy requirements for reactions – alternative sources of energy: use of microwaves and ultrasonic energy.
- Use of catalytic reagents (wherever possible) in preference to stoichiometric reagents; catalysis and green chemistry, comparison of heterogeneous and homogeneous catalysis, biocatalysis, asymmetric catalysis and photo catalysis.

Examples of Green Synthesis/ Reactions and some real world cases

1. Microwave assisted reactions in water: Hofmann Elimination, methyl benzoate to benzoic acid, oxidation of toluene and alcohols; microwave assisted reactions in organic solvents Diels-Alder reaction and Decarboxylation reaction
2. Surfactants for carbon dioxide – replacing smog producing and ozone depleting solvents with CO_2 for precision cleaning and dry cleaning of garments.
3. An efficient, green synthesis of a compostable and widely applicable plastic (poly lactic acid) made from corn.
4. Healthier fats and oil by Green Chemistry: Enzymatic interesterification for production of no Trans-Fats and Oils

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Future Trends in Green Chemistry

Oxidation reagents and catalysts; Biomimetic, multifunctional reagents; Proliferation of solventless reactions; co crystal controlled solid state synthesis (C^2S^3); Green chemistry in sustainable development.

Books Recommended/Suggested Reading:

1. *Ahluwalia, V.K. & Kidwai, M.R. New Trends in Green Chemistry, Anamalaya Publishers (2005).*
2. *Anastas, P.T. & Warner, J.K.: Green Chemistry - Theory and Practical, Oxford University Press (1998).*
3. *Matlack, A.S. Introduction to Green Chemistry, Marcel Dekker (2001).*
4. *Cann, M.C. & Connely, M.E. Real-World cases in Green Chemistry, American Chemical Society, Washington (2000).*
5. *Ryan, M.A. & Tinnesand, M. Introduction to Green Chemistry, American Chemical Society, Washington (2002).*
6. *Lancaster, M. Green Chemistry: An Introductory Text RSC Publishing, 2nd Edition, 2010.*

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B.Sc. (Hons.) Chemistry
Discipline Specific Elective

Green Chemistry

Subject Code: CHL-3223

L	T	P	C
3	1	0	4

At the end of the **Green Chemistry,** student will be able to

COs No.	Course Outcomes (COs)	Cognitive Level
1.	**Define** Green Chemistry	Remember
2.	**Identify** Principles of Green Chemistry	Remember
3.	**Describe** Examples of Green Synthesis	Remember
4.	**Identify** Future Trends in Green Chemistry	Remember

Introduction to Green Chemistry
What is Green Chemistry? Need for Green Chemistry. Goals of Green Chemistry. Limitations/ Obstacles in the pursuit of the goals of Green Chemistry

(4 Lectures)

Principles of Green Chemistry and Designing a Chemical synthesis
Twelve principles of Green Chemistry with their explanations and examples and special emphasis on the following:

- Designing a Green Synthesis using these principles; Prevention of Waste/ byproducts; maximum incorporation of the materials used in the process into the final products, Atom Economy, calculation of atom economy of the rearrangement, addition, substitution and elimination reactions.
- Prevention/ minimization of hazardous/ toxic products reducing toxicity. risk = (function) hazard × exposure; waste or pollution prevention hierarchy.
- Green solvents– supercritical fluids, water as a solvent for organic reactions, ionic liquids, fluorous biphasic solvent, PEG, solventless processes, immobilized solvents and how to compare greenness of solvents.
- Energy requirements for reactions – alternative sources of energy: use of microwaves and ultrasonic energy.
- Selection of starting materials; avoidance of unnecessary derivatization – careful use of blocking/protecting groups.
- Use of catalytic reagents (wherever possible) in preference to stoichiometric reagents; catalysis and green chemistry, comparison of heterogeneous and homogeneous catalysis, biocatalysis, asymmetric catalysis and photocatalysis.

(22 Lectures)

Examples of Green Synthesis/ Reactions and some real world cases

1. Green Synthesis of the following compounds: adipic acid, catechol, disodium iminodiacetate (alternative to Strecker synthesis)

2. Microwave assisted reactions in water: Hofmann Elimination, methyl benzoate to benzoic acid, oxidation of toluene and alcohols; microwave assisted reactions in organic solvents Diels-Alder reaction and Decarboxylation reaction
3. Surfactants for carbon dioxide – replacing smog producing and ozone depleting solvents with CO_2 for precision cleaning and dry cleaning of garments.
4. Rightfit pigment: synthetic azopigments to replace toxic organic and inorganic pigments.
5. An efficient, green synthesis of a compostable and widely applicable plastic (poly lactic acid) made from corn.
6. Healthier fats and oil by Green Chemistry: Enzymatic interesterification for production of no Trans-Fats and Oils

(12 Lectures)

Future Trends in Green Chemistry

Oxidation reagents and catalysts; Biomimetic, multifunctional reagents; Combinatorial greenchemistry; Proliferation of solventless reactions; co crystal controlled solid state synthesis(C^2S^3); Green chemistry in sustainable development.

(10 Lectures)

Books Recommended/Suggested Reading:

1. *Ahluwalia, V.K. & Kidwai, M.R. New Trends in Green Chemistry, Anamalaya Publishers (2005).*
2. *Anastas, P.T. & Warner, J.K.: Green Chemistry - Theory and Practical, Oxford University Press (1998).*
3. *Matlack, A.S. Introduction to Green Chemistry, Marcel Dekker (2001).*
4. *Cann, M.C. & Connely, M.E. Real-World cases in Green Chemistry, American Chemical Society, Washington (2000).*
5. *Ryan, M.A. &Tinnesand, M. Introduction to Green Chemistry, American Chemical Society, Washington (2002).*
6. *Lancaster, M. Green Chemistry: An Introductory Text RSC Publishing, 2nd Edition, 2010..*

2020-21

Value Added Course

Department of Civil Engineering

Course Name- Solid Waste Management **Total Contact Hours**
Course Code- CEV-0001 **36Hours**

Objectives of the Course: After studying this course the students shall be able to:

1. Explain municipal solid waste management systems with respect to its physical properties, and associated critical considerations in view of emerging technologies .Enumerate principles of development
2. Outline sources, types and composition of solid waste with methods of handling, sampling and storage of solid waste.
3. Select the appropriate method for solid waste collection, transportation, redistribution and disposal.
4. Describe methods of disposal of hazardous solid waste.

Unit I. Sources and Composition of Municipal Solid Waste. **(7 hours)**
Introduction :Sources of solid waste, Types of solid waste, Composition of solid waste and its determination. Types of materials recovered from MSW.

Unit II Properties of Municipal Solid Waste **(7 hours)**
Physical properties of Municipal Solid Waste .Chemical properties of Municipal Solid Waste. Biological properties of Municipal Solid Waste, Transformation of Municipal Solid Waste.

Unit III Solid Waste Generation and Collection **(7 hours)**
Quantities of Solid Waste. Measurements and methods to measure solid waste quantities. Solid waste generation and collection. Factors affecting solid waste generation rate. Quantities of materials recovered from MSW.

Unit IV Handling, Separation , Storage and Processing of Solid Waste . **(9 hours)**
Handling and separation of solid waste At site: Material separation by pick in, screens, float and separator magnets and electromechanical separator and other latest devices for material separation. Waste handling and separation at Commercial and industrial facilities. Storage of solid waste at the sources. Processing of solid waste in residence, Storage, conveying compacting, Shredding, pulping, granulating etc. Processing of solid waste at Commercial and industrial site.

Practicum: Survey and prepare a report on MSW of your locality and Identify its sources and write composition of MSW.

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Beswan, Aligarh

Suggested Readings

1. Integrated solid waste management, Integrated solid waste management, Mc.Graw Hill Company, London
2. Disposal and recovery of municipal solid waste, Michael E Henstock Butterworths, Ann Arbor Science Mc.Graw Hill Company, London .
3. solid waste management, P Aarne Vesilig.
4. Environmental Engineering, Mackenzie L Davis, David A Cornwell.

. List of Software/Learning Websites:

i. http://www.moef.nic.in/legis/hsm/mswmhr.html
ii,en.wikipedia.org/wiki/wastemanagement
iii.http://www.cyen.org/innovaeditor/assets/Solid%20waste%20management.pdf
iv.http://www.ilo.org/oshenc/part-vii/environmental-pollution-control/item/514-solidwaste-management-and-recycling v.www.houstontx.gov/solidwaste

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Paper: Solid Waste Management **L T P C**
Paper code: MCE-103 **4 0 0 4**

Upon successful completion of this course, it is expected that students will be able to:

S.No.	Course Outcomes (COs)	Mapping
1.	**Understand** the properties and composition of solid waste	Employability / Skill development
2.	Understand the concept of hazardous waste management.	Employability / Skill development
3.	**Understand** the concepts involved in offsite processing and disposal of municipal solid waste.	Employability / Skill development
4.	**Analyze** the collection systems to choose suitable collection route.	Employability / Skill development

Course Objectives:

The end of this course the students will be able to

1. To understand the necessity and importance of solid waste management.
2. To learn the methods and means of waste collection and transfer of solid and hazardous waste.
3. To study the different treatment approaches for MSW hazardous waste.
4. To study the design and operation landfills.

UNIT I Introduction to Solid Waste Management

Definition, sources, component and types of solid and hazardous wastes; problems due to improper solid waste management, objective and principles of SWM, functional elements of SWM; waste generation, on site handling and processing, collection, transfer, transport and disposal.

UNIT II Quantity and composition of Waste and Management

Estimation of solid waste generation and composition: sampling methodology, characterization and composition of solid waste, special waste fractions management: E-waste, plastic waste, construction and demolition waste.

UNIT III Solid Waste Disposal (Sanitory landfilling)

Classification, types and methods of land filling, design and operation of landfills, generation and control of landfill gas and lechate, landfill liner, Dump site rehabilitation.

UNIT IV Waste Processing Technologies and Energy Recovery

Thermal conversion technologies: incineration, gasification and pyrolysis, Refuse derived fuel, mechanical biological treatment: Elements of integrated waste management.

Books Recommended/Suggested Reading:

1. George Tchobanoglous, Hilary Theisen and Samuel A, Vigil, Integrated Solid Waste Management,McGraw- Hill, New York, 1993

2. CPHEEO, Manual on Municipal Solid waste management, Central Public Health and Environmental Engineering Organization, Government of India, New Delhi, 2000.

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23-9-21

Head
Department of Civil Engineering
Faculty of Engineering & Technology
Mangalayatan University, Aligarh (U.P.)