



Dayananda Sagar
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Ref : DSU/Reg/2021-22/64

Date : 08.10.2021

NOTIFICATION

SUB : Scheme & Syllabus of BVoc - I & II Semesters in Pharmaceutical Manufacturing Technology Program of Dayananda Sagar University –Reg.,

Ref: Resolution of the Board of Governors passed at its 16th Meeting held on 24.09.2021

Pursuant to resolution passed by the Board of Governors, at its 16th Meeting held on 24.09.2021, University is pleased to notify the Scheme & Syllabus of BVoc - I & II Semesters in Pharmaceutical Manufacturing Technology Program , which is applicable from the Academic Year 2020-21 , onwards.

By Order


Registrar
8/10/21.

CC: PS – Vice Chancellor / Pro Vice Chancellors /COE/CIO/CFO/ Deans/Principals
/ Chairpersons of Schools/Departments/Dean Research/Director IQAC

Enclosure: Scheme & Syllabus of BVoc - I & II Semester in Pharmaceutical Manufacturing Technology Program

DAYANANDA SAGAR UNIVERSITY

Shavige Malleshwara Hills, Kumaraswamy Layout,
Bengaluru - 560114, Karnataka.

SCHOOL OF ENGINEERING



SCHEME & SYLLABUS FOR BACHELOR OF VOCATION

SPECIALIZATION PHARMACEUTICAL MANUFACTURING TECHNOLOGY

(I& II Sem)

08.10.2021



I SEMESTER

SL	PROGRAM CODE	COURSE CODE	COURSE TITLE	CREDITS
1	P008	20VP101	ENVIRONMENTAL STUDIES	2
2	P008	20VP102	BASICS OF CGMPS	2
3	P008	20VP103	APPLIED NATURAL SCIENCE	2
4	P008	20VP104	APPLIED CHEMISTRY	2
5	P008	20VP105	ENGLISH SPOKEN	5
TOTAL				13

II SEMESTER

SL	PROGRAM CODE	COURSE CODE	COURSE TITLE	CREDITS
1	P008	20VP201	ENGINEERING DRAWING	1
2	P008	20VP202	OCCUPATIONAL HEALTH & SAFETY	4
3	P008	20VP203	PHARMA MANUFACTURING OPERATIONS	4
4	P008	20VP204	PHARMACEUTICAL CHEMISTRY	3
5	P008	20VP205	ENGLISH WRITTEN	3
TOTAL				15



20VP101: Environmental Studies - 2 Credits		
Unit-I	<p>Introduction:</p> <p>Scope and importance of environmental studies - Definition of environment - comprehensive understanding of environment</p> <p>Basic Concepts of Environment:</p> <ol style="list-style-type: none"> 1. Types of xenobiotics: Chemical, Physical, Biological pollutants; Hazard & Risk 2. Eco-kinetic & Bio-kinetic Properties of a xenobiotic 3. Dose-Response Relationships-chronic and acute effects 4. Environmental Standards: AAQS, TLV's 5. Structure of Atmosphere; Atmospheric inversions 	6 Hrs.
Unit-II	<p>Air Pollution:</p> <p>Atmosphere and its structure</p> <p>Criteria pollutants –Particulate Matter, Carbon Monoxide, Nitrogen Oxides, Sulfur Dioxide, Lead; SMOG & Air-pollution episodes</p> <p>Aerosols: Acid Rain Cycle</p>	5 Hrs.
Unit-III	<p>Water Treatment</p> <p>Hydrosphere</p> <p>Lentic and Lotic Water Systems</p> <p>Fresh Water as a resource; Rain Water Harvesting</p> <p>Treatment of potable water</p> <p>Water Standards</p>	5 Hrs.
Unit-IV	<p>Waste water-</p> <p>Characteristics, Industrial Effluents</p> <p>Municipal Sewage Water and Treatment</p> <p>Wastes and Management of Waste</p> <p>Biomedical Waste</p> <p>Solid Waste Management: Landfills, composting</p>	6 Hrs.



Unit-V	Energy: Types of energy Conventional sources of energy: fossil fuel, Coal, Non-conventional sources of energy: Biofuels - biomass, biogas	4 Hrs.
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Course Objectives:

- (i) To expose engineering students to the basic concepts and principles of environment;
- (ii) To have knowledge of the current issues' pollution endangering life on earth.
- (iii) To educate about the environmental resources, energy, pollution, management and law.

Course Outcomes:

- Delineate basic concepts that govern environmental quality, atmospheric principles and environmental standards;
- Recognize and conversant with sources and nature of pollution types, control and management;
- Energy resource types and their environmental implications;
- Apply the process of environmental impact assessment and implications of Indian Environment Laws

Text Books

1. R.C. Gaur, Basic Environmental Engineering, New age international (P) limited, publishers, 2008
2. J. Glynn Henry and Gary. W. Heinke, Environmental Science and Engineering, Prentice Hall of India, 2004
3. P. Venugopala Rao, A Text Book of Environmental Engineering, PHI Learning Pvt. Ltd., 2012
4. Lecture Notes From Course Instructors



20VP102: Basics of cGMPs - 2 Credits		
Unit-I	<p>Basic Principles of GMP and cGMP</p> <p>Law: Regulatory Bodies - Effect of Medicines: Why By Law? -GMP Legislation - Purpose of law - Development of medicines - Current Good Manufacturing Practice in manufacturing, processing, packing, or holding of drugs - cGMP for finished pharmaceuticals -</p> <p>ICH: International Conference on Harmonization</p>	5 Hrs.
Unit-II	<p>Quality Systems: 6 Components:</p> <p>Quality, Production, Laboratory, Facilities and equipment, Packaging and Labeling</p> <p>Definitions: Component, Active ingredient, Excipient, Containers and Closures</p> <p>Areas are involved: Representative sampling procedures - Supplier validation and component testing- Rejecting components, containers and closures - handling operations - First in/First out procedures</p>	6 Hrs.
Unit-III	<p>CGMP Regulations: Organization and Personnel– Responsibilities of the Quality Control Unit</p> <p>Holding and Distribution– Records and Reports</p>	5 Hrs.
Unit-IV	<p>Warehousing procedures - Distribution procedures The Meaning and Importance of CGMP in Warehousing - Meeting CGMP Standards for Outsourced Warehouses - How Does a Warehousing Provider Qualify for CGMP?</p> <p>General Requirements - Components, Labeling - Scope and Application-- Materials Management Records</p>	5 Hrs.
Unit-V	<p>The Pharmaceutical Industry's cGMP Regulations: Processing, Packing, or Holding of Drugs - Finished Pharmaceuticals - Biological Products - Electronic Records and Signatures</p>	5 Hrs.



Notes:

BVoC - PMT program is skill-intensive program. Although credits are specified for each courses, the general intent is that hands-on exercises that enhance skills related to the theoretical input shall have to be assigned to students. In general, skill portion be (50%of credits) and theory portion (50% of credits) for each course.

For example, if a course has 2 credits, 1 credit (13 hours) will be for theoretical inputs and 1 credit will be for skill based components that are assignments, field visit learning, self study and the like.

Course Objectives:

- Importance of regulations
- Appreciate Quality Systems
- State the GMP requirements for documentation
- Explain the implications of GMP documents
- Understanding of complete batch records and associated supporting documents.

Course Outcome:

On successful completion of the course, the students will have ability to attain below:

- Define key terms for cGMP
- Demonstrate knowledge of Good Manufacturing Practices and its perspectives
- Demonstrate knowledge of Good Manufacturing Practice in global contexts.
- Understanding of GMP regulations of EU, FDA and WHO
- Knowledge of International Conference of Harmonization
- Recognize the role of the FDA
- Describe the different types of inspections
- Explain the Quality System

Suggested Student Activities

1. Collect different regulations, standards and guidances available from different authorities and making decisions in consultation with concerned industry personnel on what is “best-practice” and what is right for the organization.



2. Interpret the requirements of a regulatory guideline and to design, write and implement any one regulation-compliant quality system element in an organization;
3. Collect and observe a continuous improvement is fundamental to Good Manufacturing Practice. In the assessment you will apply the principles of continuous improvement to a industry based complaint management scenario

E – Learning Links:

<https://www.fda.gov/media/92844/download>

<https://www.fda.gov/regulatory-information/search-fda-guidance-documents/part-11-electronic-records-electronic-signatures-scope-and-application>

<https://www.thebalancesmb.com/introduction-to-current-good-manufacturing-practices-cgmp-2221107>

https://www.dcvmn.org/IMG/pdf/b1_02_general_introduction_international_laws.pdf

<https://learnaboutgmp.com/elearning/21-cfr-part-211-subpart-e-control-of-components-and-drug-product-containers-and-closures/>

<https://www.apsfulfillment.com/warehousing-solutions/cgmp-warehousing/>

Reference Books:

Cox Gad, Pharmaceutical Manufacturing Handbook Regulations and Quality Shayne,
2008 by John Wiley & Sons, Inc.

A Guide to Good Manufacturing Practices (GMP) Kindle Edition

by Emmet Tobin (Author) Format: Kindle Edition

Free Download:

The Certified Pharmaceutical GMP Professional Handbook PDF Free Download

<https://lib-ebooks.com/the-certified-pharmaceutical-gmp-professional-handbook-pdf/>



20VP103: Applied Natural Science: (Human Anatomy, Physiology and Medicinal Plants) - 2 Credits

<p>Unit-I</p>	<p>Animal Cell Structure and Division: Anatomy and Division Cell Division, Mitosis, Meiosis</p> <p>Transport Mechanisms: Transport Mechanisms and Cell Permeability Passive Transport: Active Transport</p> <p>Organization of the Human Body : Anatomy Anatomic Position - Body Orientation and Direction</p>	<p>5 Hrs.</p>
<p>Unit-II</p>	<p>Bone Classification and Structure : Chemical Composition of Bone</p> <p>The Axial Skeleton: The Skull - The Vertebral Column - The Thoracic Cage</p> <p>Gross Anatomy of the Muscular System – Classification of Skeletal Muscles</p> <p>The Histology of Nervous Tissue: Neuron Anatomy - Structure of a nerve</p> <p>Gross Anatomy of the Brain Structure and Functions of brain</p>	<p>5 Hrs.</p>
<p>Unit-III</p>	<p>Heart Physiology: Cardiac Cycle and Cardiac Output; Control of Blood Pressure.</p> <p>Physiology of the Circulation: Physical Principles of Blood Flow; Short Term Regulation of Blood Pressure.</p>	<p>5 Hrs.</p>



	<p>Blood: Composition of blood- Blood types; White blood cells and Red blood cells.</p> <p>Endocrine system function: Endocrine system organs-Pituitary, Thyroid, Adrenal, Pancreas - Hormones- common diseases of endocrinal dysfunction</p>	
Unit-IV	<p>Immunology: The lymphatic system; Inflammation; Innate and Acquired immunity; Vaccines.</p> <p>Respiratory System: Mechanics of Breathing; Airway Resistance and Breathing; Transport of Oxygen and CO₂ by Blood</p> <p>Digestive System: Regulation of Gastric Secretion; Role of the Small and Large Intestines in Digestion; Role of the Liver in Metabolism.</p> <p>Urinary System: General anatomy of the kidney; Glomerular Filtration; Tubular Re-absorption;</p>	5 Hrs.
Unit-V	<p>Medicinal and Aromatic Plants</p> <p>Essential oils and biochemistry of terpenes and other aromatic compounds</p> <p>Chemistry of alkaloids and pharmaceutical applications - Chemistry of polyphenols, their health properties including antioxidant activity</p> <p>Plants as ancient and modern medicines – malaria and quinine, digitalis steroids and the drug plants</p> <p>Phyto bioactive compounds extraction methods -From ancient to modern methods - Distillation- aqueous and organic solvent extraction methods</p>	6 Hrs.



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Learning Objectives:

- Develop a thorough understanding of fundamental concepts in human physiology, interactions between major physiological systems, and the effects of selected pathological conditions on the function of these systems and their specific organs.
- Develop a solid knowledge of human anatomy including the understanding of the cause-effect relationship between structure and function of tissues, organs, and systems.
- Think critically about the importance and impact of physiology of the human body
- Demonstrate a high degree of maturity and professionalism expected of future health care professionals.

Course Outcome:

- On successful completion of the course, the students will have ability to attain below: Define and explain basic medical terminology as related to the anatomy and physiology. Understand, identify, and describe the various regions, sections, positions and directions of the body.
 - Identify and describe the major body cavities and their subdivisions.
 - Understand and describe the anatomy and physiology of the cell, tissues, skeletal, muscular, nervous system.
 - Students would be understand the basic structural and functional elements of human body
 - Students would have knowledge on Skeletal and muscular systems
 - Students would be able to comprehend circulatory and nervous systems and their components
- Students would study importance of digestive and urinary systems in Human body

E – Learning Links:

<https://www.healthline.com/health/the-endocrine-system#hormones>

<https://www.britannica.com/science/human-endocrine-system>



Reference Books:

1. Prabhjot Kaur. Text Book of Anatomy and Physiology. Lotus Publishers. 2014
2. Elaine.N. Marieb , Essential of Human Anatomy and Physiology, Eight Edition, Pearson Education, New Delhi 2007
3. Valerie C. Scanlon and Tina Sanders, Essential of Human Anatomy and Physiology, Fifth Edition, F.A. Davis Company, Philadelphia 2007
1. Frederic H. Martini, Judi L. Nath, Edwin F. Bartholomew, Fundamentals of Anatomy and Physiology. Tenth Edition, Pearson Publishers, 2014
2. William F.Ganong, Review of Medical Physiology, 22nd Edition, Mc Graw Hill, New Delhi. 2005
3. Eldra Pearl Solomon, Introduction to Human Anatomy and Physiology, Third Edition, W.B. Saunders Company, 2008
4. Guyton and Hall, Medical Physiology, 13th Edition, Elsevier Saunders, 2015.



20VP104: Applied Chemistry - 2 Credits		
Unit-I	Classification of Elements Need for the Periodic Classification of Elements - the need of classification of elements - Mendélev's periodic table - Achievements of Mendeléev's Periodic Table-Metallic and Non-metallic properties of elements	5 Hrs.
Unit-II	Unit -II: Thermo Chemistry Internal energy and Enthalpy-Exothermic and Endothermic reactions- Solutions and Colloids - electronegativity	5 Hrs.
Unit-III	<i>Basics of Organic Chemistry</i> Unique characteristics of carbon- Hydrocarbons-Functional group- IUPAC Nomenclature of Organic compounds	5 Hrs.
Unit-IV	Hydrocarbons: Saturated, unsaturated, aromatic hydrocarbons and a few examples for each type Aromatic Hydrocarbons: Aromatic compounds-Heterocyclic compounds Hetero Atomic Organic Compounds: Preparation methods and reactions of: 1. Ethyl chloride 2. Ethanol 3. Diethyl ether 4. Acetaldehyde 5. Acetone	6 Hrs.
Unit-V	Fundamentals of Biological Chemistry: Compounds play significant roles in our lives: Transition metal complexes, alcohols, phenols, proteins, carbohydrates, carboxylic acids, lipids, amino acids, enzymes, nucleic acids, and vitamins.	5 Hrs.
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Reference Books:

1. Text book of Inorganic Chemistry by Puri & Sharma
2. Text book of Organic Chemistry by Puri & Sharma
3. Text book of Organic Chemistry by Arun Bahl & B.S.Bahl



E – Learning Links:

1. <https://www.khanacademy.org/science/chemistry/periodic-table>
2. <https://en.wikipedia.org/wiki/Hydrocarbon>
3. http://apple.niu.edu.tw/ezfiles/0/1000/img/48/wang_chemistry_ch08.pdf
4. <https://www2.chemistry.msu.edu/faculty/reusch/VirtTxtJml/introl.htm>
5. <https://www.masterorganicchemistry.com/>
6. <https://ncert.nic.in/textbook/pdf/jesc105.pdf>

Course Objectives:

1. The student will understand and describe the principles of classification of periodic chart of elements
2. Will describe the metallic and non-metallic properties of elements
3. The student will be conversant and describe the characteristics organic compounds and hydrocarbons
4. The student will understand and describe biologically important chemical compounds

Course Outcome:

On successful completion of the course, the students will have ability to attain below:

1. Explain Main Features of Modern Periodic Table, Classification of elements, Merits and demerits of modern periodic table
2. Explain Internal energy and Enthalpy, Law of conservation of energy, Exothermic and Endothermic reactions, Heat of Reaction and types of heats of reactions
3. Discuss the Classification of Organic compounds, IUPAC Nomenclature of Organic compounds, Different classes of Organic compounds
4. Discuss the Classification of Hydrocarbons, Preparation methods and Reactions of Methane, Ethylene and Acetylene
5. Aromatic Hydrocarbons, Explain Huckles rule, Arene and Poly nuclear aromatic compounds, Preparation methods and Reactions of benzene
6. Explain the various classes of hetero atomic organic compounds
7. Discuss the fundamentals of life molecules, compounds and their role in our lives.

Suggested Student Activities

1. Student visits Library to refer the Text books, reference books and manuals to find their specifications
2. Identify and explain various natural processes, exothermic and endothermic reactions in our daily life.
3. Quiz on IUPAC nomenclature of organic compounds.
4. Prepare chart of classification of Organic compounds
5. Prepare chart of classification of Hydrocarbons
6. Make chart showing preparation and reactions of methane, ethylene and acetylene
7. Write resonance structures of benzene and other aromatic compounds
8. Make chart showing preparation and reactions of various organic compounds
Step-1: Data/ literature collection.

Step-2: Summarization of data/ literature collected.

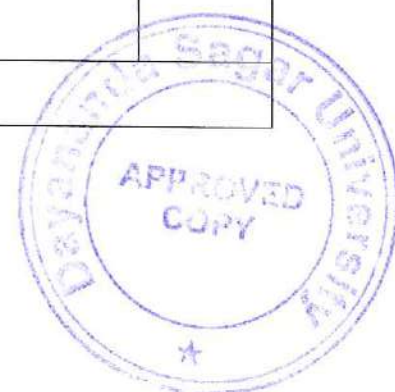


Step-3: Explain the process and compare them with the help of power point presentation/ Chart preparation

Step-4: Submit the report.



20VP105: English - Spoken - 5 Credits		
Unit-I	<p>Introduction to Communication, Definition, Nature and Scope of Communication</p> <p>Types and categories of Communication, Role of culture in communication, Cross – cultural communication skills, Corporate skills, Occupation specific Communication Skills, Barriers to communication, Importance and Purpose of Communication • Process of Communication,</p> <p>Listening Skills Purpose of Listening</p> <p>Listening to Conversation (Formal and Informal)</p> <p>Active Listening- an Effective Listening Skill</p> <p>Benefits of Effective Listening</p> <p>Barriers to Listening</p>	15Hrs.
Unit-II	<p>Meaning of non-verbal skills, Types and non-verbal skills, Personality Development, English Language skills, work specific skills, Efficiency and effectiveness in spoken language. Vocabulary and behavior, Importance of non-verbal communication in spoken language. Non-Verbal Communication - Personal Appearance □ Gestures Postures Facial Expression Eye Contacts Body Language (Kinesics) Time language Silence Tips for Improving Non-Verbal Communication</p>	15 Hrs.
Unit-III	<p>Business Communication</p> <p>Definition, Agenda, types of meetings, Tools and methods to conduct seminar, conferences, meetings, barriers technical communication, Personal, Social and Business Barriers, Overcoming barriers</p>	15 Hrs.
Unit-IV	<p>Nature of Pharmaceutical Companies and Scope for Communication</p> <p>Introduction to the objectives of Pharmacy companies Communication with clients and customers</p> <p>Jargons of the Pharmacy world,</p> <p>Role of Public Relations in Pharmaceuticals Company,</p> <p>Attributes of PR practitioner,</p> <p>Code of conduct for PR professionals.</p>	15 Hrs.
Unit-V	<p>Communication for CSR activities in Pharmaceutical Company</p> <p>Advertisements, MMS, video conferencing, reporting</p> <p>Hands on activities</p>	5 Hrs.



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For example, if a course has 2 credits, 1 credit (13 hours) will be for theoretical inputs and 1 credit will be for skill based components that are assignments, field visit learning, self study and the like.

Reference Books:

1. Vikas (Life skills Manual) : Published by: Member Secretary & Executive Director, Karnataka JnanaAayoga (Karnataka Knowledge Commission) Govt of Karnataka, Copy Right:2010 Karnataka JnanaAayoga
2. ManikGhos, ‘‘Positivity – A way of Life’’, Published by Orient BlackswanPvt Ltd 3. Swami Vivekananda, ‘‘Personality Development’’, published by Ramakrishna Math and Ramakrishna Mission (December 2011)
3. Philip Lesly,2000, Handbook of Public Relations and Communication, JBS Publishers, New Delhi
4. Meenakshi Raman & Prakash Singh : Business communication, Oxford University Press
5. Asha Kaul : Business Communication, New Delhi Prentice Hall
6. Wren & Martin – English Grammar Book

E – Learning Links:

1. <http://youtu.be/3Tu1jN65slw>
2. http://youtu.be/lwWi_SfDpzg
3. <http://youtu.be/sYBw9-8eCuM>
4. <http://youtu.be/et1l6J5MG0w>

Course Objectives:

1. To make the students fluent in spoken language (English) and converse with confidence with the target audience.
2. To make the understanding of intra and inter personal qualities needed for communication
3. To make them understand the importance of verbal and non-verbal aspects for effective communication
4. To overall groom the personality and communication skills.



Course Outcome:

On successful completion of the course, the students will have ability to

1. Communicate fluently with clarity
2. Adopt and adapt to situations and communicate
3. Follow a pattern/order in communication (introduction, content, pros & cons and conclude appropriately)
4. Use jargons and communicate technically to their community
5. Structure their speech/content to reach out to the target group.

Suggested Student Activities

1. Visiting library, Read magazines and books with illustrations to improve conversation
2. Group Discussions.
3. Quiz for vocabulary enhancement.
4. Questionnaire for field work
5. Podium talks
6. Reading aloud, reading diagrams/pictures



20VP201 : Engineering Drawing - 1 Credit		
Note:		
<ul style="list-style-type: none"> • First angle projection to be followed • Instructions relevant to various drawings may be given along with appropriate demonstration, before assigning drawing practice to the students. 		
Unit-I	Introduction: Fundamentals, Drawing Instruments and their uses, BIS conventions, Lettering, Dimensioning, line conventions, scaling, symbols, fits & tolerances	2 Hrs.
Unit-II	Theory of Projections: Types of projections, sketching practice of pictorial view from objects, exercise on missing surfaces and views, Identification of surfaces on drawn views & object drawn.	3 Hrs.
Unit-III	Geometric construction & Curves: Drawing of parallel &, perpendicular lines, Construction of polygons & solid objects – Cube, Cone, Prism, Pyramid, Frustum of Cone with dimensions, Methods of line segment & bisecting, Engineering Curves-Ellipse, parabola, hyperbola Projection of Points: Projections of points located in same quadrant and different quadrants	3 Hrs.
Unit-IV	Projection of Lines: Projection of straight lines inclined to both the principal planes – Determination of true lengths and true inclinations by rotating line method.	3 Hrs.
Unit-V	Projection of planes: Projection of planes inclined to both the principal planes by change of position method.	4 Hrs.
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Text Book(s)

1. Gopalakrishna, K. R. (2005) Engineering Graphics, 32nd edition, Subash Publishers Bangalore, India
2. Surjit Singh (2014), A text book of engineering drawing, Dhanpat Rai & Co, India



Reference(s)

1. Basant Agarwal and Agarwal C.M., (2008), Engineering Drawing, Tata McGraw Hill Publishing Company Limited, NewDelhi.
2. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House, Gujarat, India

Objectives:

- To create awareness and emphasize the need for Engineeringdrawing
- To follow basic drawing standards andconventions
- To understand the principles of geometrical objects, curves and constructmanually
- To understand the concepts of orthographic projections
- To construct orthographic projection of points, lines and planes

Course Outcomes:

After undergoing this course students will be able to:

- Explain usage of instruments, dimensioning & tolerances, conventions and standards related to workingdrawings
- Construct points, lines and planes using orthographic projections principles
- Read and apply engineering drawing for different application in the field of work.



20VP202 :Occupational Health & Safety - 4 Credits		
Unit-I	<p>Principles of Industrial Hygiene: Introduction - Introduction to Industrial Hygiene - Standards and Guidelines and Ethical Code of Conduct - Industrial Hygiene Concepts -</p> <p>Work environment - Objectives of Occupational Hygiene - Levels of contaminants TLVs and its types - (ACGIH) -BEIs</p> <p>Recognition of Health Hazards:Potential health hazards, air contaminants -</p> <p>Physical Hazard at Workplaces: Thermal Stress</p> <p>Chemical Hazards at Workplaces:</p> <p>Biological Hazards Workplaces</p> <p>Ergonomic Hazards Workplaces</p>	15 Hrs.
Unit-II	<p>Evaluation:</p> <p>Basic Toxicology</p> <p>Exposure Assessment Concepts</p> <p>Air Sampling for Particulate Matter</p> <p>Air Sampling for Gases and Vapors</p> <p>Microbial Sampling</p> <p>Control:</p> <p>Hierarchy of Controls</p> <p>Principles of Ventilation</p> <p>Personal Protective Equipment and Other Control Options</p>	15 Hrs.
Unit-III	<p>Occupational Diseases: Characteristics of occupational and other work related diseases - Concepts in Occupational Health -</p> <p>Physical Hazards at workplace - Thermal Stress - Cold Stress - Vibrations - Radiation</p> <p>Chemical Hazards: Gases - Vapors - Metals - Organic Solvents, Dust - Silicosis - Asbestosis, Pesticides - Occupational Infections - Occupational Dermatitis - Reproductive Effects - Behavioural Psychosomatic Disorders - Cardiac Health Disease - CNS Effects - Functions of an Occupational Health Service</p>	15 Hrs.



Unit-IV	Occupational Safety: Occupational safety and accident prevention, Basic concepts and definitions - Occupational accidents - Causes of accidents and injuries - Prevention and control of occupational accidents - Basic First Aid Practices	15 Hrs.
Unit-V	Occupational Ergonomics: A multidiscipline science - common causes of work accidents caused by human errors - Ergonomic Hazards, Ergonomic Guidelines, Ergonomic injuries and their classification - Reporting (proactive and early), Ergonomic Risk Factors - Use of anthropometric data Indian Factories Act - Hazardous Processes - Permissible - Health, Safety and Welfare Provisions	15 Hrs.
<p>Notes:</p> <p>BVoC - PMT program is skill-intensive program. Although credits are specified for each courses, the general intent is that hands-on exercises that enhance skills related to the theoretical input shall have to be assigned to students. In general, skill portion be and theory portion are integrated in each course.</p> <p>For example: the skill based components that are assignments, field visit learning, self study, lab practice and the like are integrated with theoretical inputs.</p>		

Gist of the Course

Occupational safety and health is a discipline with a broad scope involving three major fields – Occupational Safety, Occupational Health and Industrial Hygiene.

- **Occupational safety** deals with understanding the causes of accidents at work. Ways to prevent unsafe act and unsafe conditions in any workplace. Safety at work discusses concepts on good housekeeping, proper materials handling and storage, machine safety, electrical safety, fire prevention and control, safety inspection, and accident investigation.
- **Occupational health** is a broad concept which explains how the different hazards. Risks at work may cause an illness and emphasizes that health programs are essential in controlling work-related and/or occupational diseases. Industrial hygiene discusses the identification, evaluation, and control of
- **Industrial Hygiene** is a discipline dealing with the study of physical, chemical, biological and ergonomic hazards.



Reference Books:

Web Links

1. Occupational Health and Safety Books PDF (Updated SEP 2020) (free-safety-training.com)
<https://www.free-safety-training.com/product/occupational-health-and-safety-books-pdf/>
2. Principles of Industrial Hygiene : Lecture Materials
(jhsph.edu)<http://ocw.jhsph.edu/index.cfm/go/viewCourse/course/PrinciplesIndustrialHygiene/coursePage/lectureNotes/>
3. http://www.oshc.dole.gov.ph/images/OSHTrainingAnnouncement/BOSH-Manual_Narrative-Handout.pdf

Course Objectives:

The Occupational Health and Safety Course has the following objectives in deliberating, discussing and understanding the principles and practice:

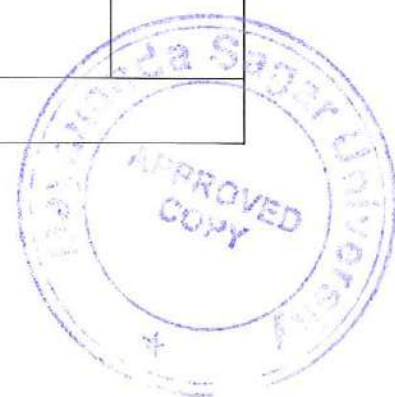
- To maintain the health and safety of employees in a manufacturing facility
- To prevent the unfavorable effects on health caused by working conditions
- To become familiar to occupational environment of needs of workers.
- To consider the issues relating to industrial safety, occupational medicine, industrial hygiene, training & education.
- To be conversant with regulations and laws under Indian Factories Act

Course Outcome: At the end of the course students will be able to:

- Interpret and apply work environment contaminant standards, legislative requirements and best practices in a variety of workplaces.
- Apply risk management principles to anticipate, identify, evaluate and control physical, chemical, biological and psychosocial hazards.
- Collect, manage, and interpret information and data to identify trends and issues in the workplace.
- Discuss the implications of exposures, thermal stress, cold stress, chemical, biological hazards at workplaces.
- Design, support, and evaluate health and safety programs and implement procedures using project management principles and processes appropriate to the task.



20VP203 Pharma Manufacturing Operations - 4 Credits		
Unit-I	DosageForms Definition, need for dosage forms, classification of dosage forms. Definition and introduction- Tablets, capsules, powders, granules, snuffs, dentifrice, insufflations, dusting powder, emulsion, suspension, syrups, solutions, liniments, lotions, elixirs, linctus, ointments, pastes, creams and suppositories.	10Hrs.
Unit-II	Pharmaceutical calculation Introduction, weight and measures, measurement systems- Imperial system, Metric system, Avoirdupois system, Apothecaries system. Calculations involving percentage solutions, proof spirit and isotonic solutions.	10 Hrs.
Unit-III	Size reduction and Separation Size reduction- Definition, objectives, mechanisms, factors affecting size reduction. Hammer mill, cutter mill and ball mill. Size separation- Definition, objectives, mechanisms and applications of size separation. Sieve shaker and cyclone separator.	15 Hrs.
Unit-IV	Mixing Definition, factors affecting mixing, applications, mechanisms of mixing. Planetary mixer and Double cone blender	10 Hrs.
Unit-V	Drying and Evaporation Drying- Definition, objectives, mechanisms, applications and rate of drying curve. Tray dryer, spray dryer and fluidized bed dryer. Evaporation- Definition, objectives, factors influencing evaporation and applications. Horizontal tube evaporator and multiple effect evaporator.	15 Hrs.



Notes:

BVoC - PMT program is skill-intensive program. Although credits are specified for each courses, the general intent is that hands-on exercises that enhance skills related to the theoretical input shall have to be assigned to students. In general, skill portion be and theory portion are integrated in each course.

For example: the skill based components that are assignments, field visit learning, self study, lab practice and the like are integrated with theoretical inputs

Reference Books

1. Ansel's Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Walkins, New Delhi.
2. Lachman/Lieberman's Theory and Practice of Industrial Pharmacy, CBS Publishers & Distributors Pvt Ltd.
3. Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi.
4. Carter S.J., Cooper and Gunn's. Tutorial Pharmacy, CBS Publications, New Delhi.
5. C.V.S. Subrahmanyam, J. ThimmaSetty, Sarasija Suresh, V. Kusum Devi. Pharmaceutical Engineering (Principles and Practice). Vallabh Prakashan, Delhi.

Course Objective

1. Introduction to various pharmaceutical dosage forms.
2. To study the various pharma operations involved in the manufacturing of dosage forms.

Course Outcome

1. The students will be able to have an understanding about operations of the pharmaceutical industry.
2. The students will have an overview of basic skills involved in pharmaceutical operations.
3. The students will have knowledge on various pharmaceutical dosage forms.



Suggested Student Activities

1. Visit library to refer the text books, reference books and manuals.
2. Explain various pharmaceutical operations, their mechanisms, advantages and disadvantages.
3. Quiz on various pharmaceutical operations.
4. Quiz on various pharmaceutical dosage forms.
5. Prepare chart of classification of various dosage forms.



20VP204 : Pharmaceutical Chemistry - 3 Credits		
Unit-I	Impurities in pharmaceutical substances: History of Pharmacopoeia, Sources and types of impurities, principle involved in the limit test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals, modified limit test for Chloride and Sulphate. To Carry out limit tests for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals.	9 Hrs.
Unit-II	Study of Monograph analysis of Bentonite, Dried Aluminium Hydroxide Gel, Calcium gluconate, Magnesium Hydroxide, Ferrous sulphate, Sodium carbonate and copper sulphate. To Carry out Identification tests for the above compounds.	6 Hrs.
Unit-III	Methods of expressing concentration like Molarity and Normality. Primary and secondary standards. Preparation and standardization of various solutions Like Oxalic acid, sodium hydroxide, hydrochloric acid, sodium thiosulphate, Sodium Carbonate, potassium permanganate and Ceric ammonium Sulphate.	10 Hrs.
Unit-IV	Acid base Titrations and complexometric titrations: Theories of acid base indicators, classification of acid base titrations and theory involved in titrations of strong, weak, and very weak acids and bases, neutralization curves. To carry out assay of Ammonium chloride by acid base Titration. Assay of calcium gluconate by Complexometric titration.	10 Hrs.
Unit-V	Non aqueous titration and redox Titrations. Principles and techniques. To carry out titration of Copper sulphate by Iodometry, Hydrogen peroxide by Permanganometry and estimation of Sodium Benzoate by Non Aqueous Titration.	10 Hrs.
<p>Notes:</p> <p>BVoC - PMT program is skill-intensive program. Although credits are specified for each courses, the general intent is that hands-on exercises that enhance skills related to the theoretical input shall have to be assigned to students. In general, skill portion be and theory portion are integrated in each course.</p> <p>For example: the skill based components that are assignments, field visit learning, self study, lab practice and the like are integrated with theoretical inputs</p>		

Reference Books:

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone, Press of University of London.



2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. Bentley and Driver's Textbook of Pharmaceutical Chemistry.
4. Indian Pharmacopoeia.
5. M.L Schroff, Inorganic Pharmaceutical Chemistry

Course Objectives:

- (1) To know the sources of impurities and methods to determine the impurities in Pharmaceuticals.
- (2) To understand the monograph analysis of some Pharmaceutical compounds as per Indian Pharmacopoeia.
- (3) To understand the principles of Volumetric analysis like acid base titration, Non aqueous titrations and Redox Titrations.

Course Outcome:

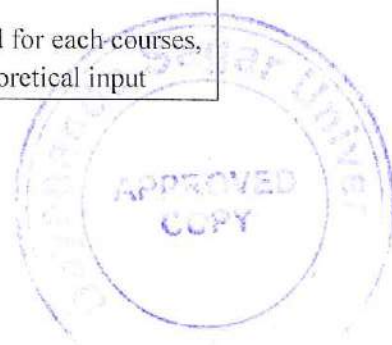
- (1) Upon completion of the course the student shall be able to understand the types of impurities in Pharmaceuticals and shall be able to carry out limit tests for impurities as per requirements of Indian Pharmacopoeia.
- (2) The student will be able to learn the Information for a drug (or class of related drugs) such as the kinds and amounts of ingredients it may contain, the conditions and limitations for which it may be offered, directions for use, warnings, and other information that its labeling must contain and will be able to perform the identification tests of some pharmaceutical compounds.
- (3) The student shall be able to learn methods of expressing concentrations, preparation of standard solutions and techniques of acid base, Non Aqueous titrations, Redox Titrations and Complexometric titrations.

Suggested Student Activities

1. Student visits Library to refer the Text books, reference books and manuals.
2. Quiz on expression of concentrations
3. Prepare chart of classification of Organic compounds
4. Prepare chart of Monograph analysis of I.P Compounds.
5. Make charts about different titrimetric methods.



20VP205 English –Written - 3 Credits		
Unit-I	Introduction to pictorial and script writing, Difference between Personal and Business Communication Communication Network in an Organization Internal and External Communication Horizontal & Vertical(Downward/Upward) Communication Age of Globalization and the Need for Communicating in English	5 Hrs.
Unit-II	Verbal communication (written) Effective Writing Skills – Remedial English Grammar Types of Sentences Main Forms of Written Communication Paragraph Writing (Linkage and Cohesion) Understanding and Applying Vocabulary	10 Hrs.
Unit-III	Communication for Career Building Applying for a job , Preparing Cover letters , Preparing a CV/Resume and Effective Profile writing Presentation Skills, Preparing a PowerPoint Presentation, Greeting and introducing , Presenting a Paper	10 Hrs.
Unit-IV	Business Communication Importance of written documents, different formats of letter writing, (formal) Email, Letters, Proposals, Contracts. Preparing Agenda and Minutes for Meetings Writing Notices and Memos, Drafting an E-mail, Press Release Correspondence with Govt./Authorities, Office Orders, Enquiries and Replies)	10 Hrs.
Unit-V	Technical Writing Introduction, Definition, Skill sets for Technical Writing, Process and steps to technical writing, Best practices in technical writing..	10 Hrs.
Notes:		
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shall have to be assigned to students. In general, skill portion be and theory portion are integrated in each course.

For example: the skill based components that are assignments, field visit learning, self study, lab practice and the like are integrated with theoretical inputs

Reference Books:

1. Vikas (Life skills Manual) : Published by: Member Secretary & Executive Director, Karnataka JnanaAayoga (Karnataka Knowledge Commission) Government of Karnataka, Copy Right:2010 Karnataka JnanaAayoga
2. ManikGhos, "Positivity – A way of Life", Published by Orient BlackswanPvt Ltd 3. Swami Vivekananda, "Personality Development", published by Ramakrishna Math and Ramakrishna Mission (December 2011)
3. Philip Lesly, 2000, Handbook of Public Relations and Communication, JBS Publishers, New Delhi
4. Meenakshi Raman & Prakash Singh: Business communication, Oxford University Press
5. Asha Kaul : Business Communication, New Delhi Prentice Hall

E – Learning Links:

1. <http://youtu.be/kCzUVVKX1E8>
2. <http://youtu.be/7ptiYPcleM8>
3. http://youtu.be/biocrCx5T_k

Course Objectives:

1. To make the students fluent in written language (English) and write emails and letters with clarity.
2. To enable students to make notes and report
3. To make them understand the importance of written documents that is used as future reference
4. To prepare speeches and write for Public Relations activities

Course Outcome:

On successful completion of the course, the students will have ability to

1. Communicate fluently with clarity
2. Follow email etiquettes
3. Follow a pattern/order/format of report, content, letter and email writing
4. Use jargon words suitably



5. Follow structure in writing - Introduction, subject matter, conclude appropriately.

Suggested Student Activities

1. Visiting library, Read magazines and books with illustrations to know to respond
2. Telephonic note taking and note leaving
3. Wall magazines and charts to represent concepts
4. Field work to collect data / conceptual data collection and completing a structured minor project
5. Writing flow charts -

