

CHHATTISGARH SWAMI VEVEKANAND TECHNICAL UNIVERSITY, BHILAI
Course of Study and Scheme of Examination
Bachelor of Pharmacy
III-Semester

S.No.	Board of Study	Subject Code (New)	Nomenclature and Name of the Subject	Periods Per Week			Scheme of Exam Theory / Practical				Credits L+(T+P)/2
				L	T	P	ESE	CT	TA	Total Marks	
1	Pharmacy	341311(41)	Pharmaceutics-III (Pharmaceutical Engineering –I)	4	1	0	70	20	10	100	5
2	Pharmacy	341312(41)	Pharmaceutics – IV (Dispensing and Community Pharmacy)	4	1	0	70	20	10	100	5
3	Pharmacy	341313(41)	Pharmaceutical Chemistry – IV (Organic – II)	4	1	0	70	20	10	100	5
4	Pharmacy	341314(41)	Anatomy, Physiology and Health Education –II	4	1	0	70	20	10	100	5
5	Pharmacy	341315(41)	Pharmacognosy – II	4	1	0	70	20	10	100	5
6	Pharmacy	341321(41)	Pharmaceutics-III (Pharmaceutical Engineering - I) Practical	0	0	3	60	-	40	100	2
7	Pharmacy	341322(41)	Pharmaceutics –IV (Dispensing and Community Pharmacy) Practical	0	0	3	60	-	40	100	2
8	Pharmacy	341323(41)	Pharmaceutical Chemistry –IV (Organic II) Practical	0	0	3	60	-	40	100	2
9	Pharmacy	341324(41)	Anatomy, Physiology and Health Education –II Practical	0	0	3	60	-	40	100	2
10	Pharmacy	341325(41)	Pharmacognosy – II Practical	0	0	3	60	-	40	100	2
Total				20	5	15	650	100	250	1000	35

L- Lecture, T- Tutorial, P- Practical, ESE- End Semester Exam, TA- Teacher's Assessment

Minimum Pass Marks:

Duration of Theory Papers: 3 Hours.

(A) Theory and Sessional (combined): 50 Percent

(B) Practical and Sessional (combined): 50 Percent

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Semester: 3rd

Subject: Pharmaceutics- III (Pharmaceutical Engineering-I)

Total Theory Periods: 40

Total Marks in End Semester Exam: 70

Minimum no. of class tests to be conducted: 2

Branch: B. Pharm

Code: 341311(41)

Total Tut. Periods: 1

Unit Operation-

Unit operations and processes, Material and energy balances, Dimensionless equations; formulas and groups.

Materials of Pharmaceutical Plant Construction-

Factors affecting the material selection for pharmaceutical plants, Physical; Chemical; Mechanical properties and use of the important materials of construction with special reference to Ferrous metals, Copper, Aluminium, Nickel, Glass, Plastics and their alloys, Heat and Corrosion resistant alloys.

Corrosion and its Prevention -

General considerations, Types of Corrosion, Methods of reducing Corrosion, Simple mathematical problems.

Industrial Hazards and Safety Measures -

Mechanical, Chemical, Electrical, Fire and Dust Hazards, Safety requirements, Legal requirements, Industrial dermatitis.

Fluid Flow -

Fluid static, Manometers, Types of flow, Reynold's Number and its significance, Concept of boundary layers, Bernoulli's theorem and its applications, Measurement of flow of fluids, Valves.

Material Handling Systems -

- a) Liquid handling: Different types of pumps.
- b) Solid handling: Conveyors.

Heat Transfer -

Heat transfer mechanisms, Heat transfer by conduction, Fourier's law, Natural and forced convection, Surface and overall heat transfer coefficients, Heat transfer by radiation, Heaters and heat exchangers.

Humidity, Air-Conditioning and Refrigeration -

Basic concepts and definitions of various terms. Psychrometric charts, Wet bulb theory, Measurement of humidity. Application of humidity measurement, air-conditioning and refrigeration in Pharmacy.

Automated Process Control Systems:

Process variables, Temperature, Pressure, Flow, Level and Vacuum and their measurements.

Elements of computer aided manufacturing (CAM).

Reference / Recommend Books:

1. Khanna NK - Pharmacy Practicals – (CBS, ND)
2. Paradkar - T.B. of Pharma Engg. (Nirali Prakashan)
3. Brown - Unit operations in Chemistry Engg.(TMH)
4. Badger/ Banchow - Chemical Engineering (TMH)
5. GHOSHLK - HB of pharmaceutical Technology (CBS, New Delhi)
6. Sambamurthy - Pharmaceutical Engg. (Vallabh)
7. Subrahmanayam - Pharma Engg. (Vallabh)
8. Paradkar - Practical Pharma Engg. (Nirali)
9. Jeevan Jyothi - Practical Manual of Pharma Engg. (Nirali)

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Semester: 3rd

Subject: Pharmaceutics- IV (Dispensing And Community Pharmacy)

Total Theory Periods: 40

Total Marks in End Semester Exam: 70

Minimum no. of class tests to be conducted: 2

Branch: B. Pharm

Code: 341312(41)

Total Tut. Periods: 1

Prescription:

Prescription, Handling of prescription, Source of errors in prescription, Care required in dispensing prescriptions. Brief introduction of commonly used Latin terms in prescription.

General Dispensing Procedures including labelling of dispensed products.

Principles involved and procedures adopted in dispensing of typical prescriptions-Solutions, Mixtures, Emulsions, Lotions, Liniments, Powders, Capsules, Tablet triturates, Ointments, Creams, Pastes, Suppositories and Ophthalmics.

Incompatibilities:

Physical, Chemical and Therapeutic incompatibilities, Incompatibility of common occurrence and their correction.

Pharmaceutical Calculations –

Basis of posology, Detection of over doses in prescription, knowledge of prophylactic and therapeutic doses with route of administration.

Calculation of doses, Enlarging and reducing receipes, Isotonic solutions, Displacement value.

Community Pharmacy -

Organization and structure of retail and wholesale drug stores, Legal requirements for establishment and maintenance. Dispensing of proprietary products, Maintenance of records of retail and wholesaler, Patient counseling, Role of Pharmacist in community health care and education, Hazards of medication, Life-saving practices.

A brief study of proprietary products available in the market belonging to Chemotherapeutics, Vitamins; Anti-histaminics, expectorants and NSAID'S category.

A brief study of Hospital formulary.

Drug Information Services -

Sources of information on drug, diseases, treatment schedules; procurement of informations including computer services. Drug profile, Cases on drug interaction and adverse reactions, Retriaval of information Documentation and prevention.

Reference / Recommend Books:

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| 1. | KhannaNK | - | Pharmacy Practical (CBS NT) |
| 2. | Cooper & Gunn | - | Dispensing for Pharmacy Students (CBS) |
| 3. | Nanda- Khar | - | Practical Dispensing Pharmacy (CBS) |
| 4. | N.K. Jain | - | Pharmaceutical Artimatic (CBS) |
| 5. | Jain & Sharma | - | TB of Professional Pharmacy (Vallabh) |
| 6. | Parmar NS | - | Health Edu & Community Pharmacy (CBS) |
| 7. | RM Mehta | - | Dispensing Pharmacy (Vallabh) |

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI**

Semester: 3rd

Branch: B. Pharm

Subject: Pharmaceutics- Pharmaceutical Chemistry - IV (Organic – II) Code: 341313(41)

Total Theory Periods: 40

Total Tut. Periods: 1

Total Marks in End Semester Exam: 70

Minimum no. of class tests to be conducted: 2

Heterocyclic Compounds:

Nomenclature, structure and reaction of Imidazole, Indole, Pyrrole, Furan, Pyrimidine, Quinoline and Isoquinoline

Chemistry of: Lipids, Carbohydrates, Proteins and Nucleic acids.

Catalytic hydrogenation and dehydrogenation, Metal hydride reduction, Reduction with hydride and its derivatives. Oxidation with peroxy acids. Electrolytic reaction. Sigmatropic reaction.

Selected reaction and mechanism of synthetic importance:

Mannich reaction, Beckmann reaction, Fitting reaction, Michael addition, Di alder reaction, Wittig rearrangement.

Polymer:

Polymers and Polymerization and their importance in pharmacy

Nucleophilic aromatic substitutions, Electrophilic aromatic substitutions. Organic reagents used in drug synthesis.

Reference / Recommend Books:

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|-----|------------------------|---|---|
| 1. | Morrison & Boyd | - | Organic Chemistry (TMH) |
| 2. | Morrison & Boyd | - | Problems in Organic Chemistry (TMH) |
| 3. | Harkishan Singh | - | Org. Pharma Chemistry (Vollabh) |
| 4. | R.K. Bansal | - | A TB of org Chemistry (New Age) |
| 5. | P.S. Kalsi | - | Stereo Chemistry - conformation & Mechanism (New Age) |
| 6. | AK Srivastava | - | Organic Chemistry made Simple (New Age) |
| 7. | R K Bansal | - | Org Chemistry - Problem & Solution (New Age) |
| 8. | Bansal & Bansal | - | Org Chemistry - Problems & Solution (New Age) |
| 9. | PS Kalsi | - | Organic Reaction & their Mechanism (New Age) |
| 10. | Mukhargee/Singh/Kapoor | - | Org. chemistry Vol. I +II+III (New Age) |

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI**

Semester: 3rd

Branch: B. Pharm

Subject: Anatomy, Physiology and Health Education - II Code: 341314(41)

Total Theory Periods: 40

Total Tut. Periods: 1

Total Marks in End Semester Exam: 70

Minimum no. of class tests to be conducted: 2

Digestive System -

Gross anatomy of the gastrointestinal tract, Functions of its different parts including those of liver, pancreas and gall bladder, various gastrointestinal secretions and their role in the absorption and digestion of food. Disorders of digestive system.

Respiratory System -

Anatomy of respiratory organs, Functions of respiration, Mechanism and regulation of respiration, Respiratory volumes and vital capacity.

Central Nervous System -

Function of different parts of brain and spinal cord, Neurohumoral transmission in the central nervous system, Reflex action, Electroencephalogram, Specialized functions of the brain, cranial nerves and their functions.

Autonomic Nervous System -

Physiology and functions of the autonomic nervous system. Mechanism of neurohumoral transmission in the A.N.S.

Urinary System -

Various parts, Structures and functions of the Kidney and Urinary tract. Physiology of urine formation and acid-base balance. Diseases of urinary system.

Reproductive System -

Male and female reproductive systems and their hormones, Physiology of menstruation, coitus and fertilization, Sex differentiation, spermatogenesis and oogenesis, Pregnancy - its maintenance and parturition.

Endocrine System -

Basic anatomy and physiology of the Pituitary, Thyroid, Parathyroid, Adrenals, Pancreas, Testis and Ovary, their hormones and functions.

Sense Organs -

Basic anatomy and physiology of the eye (vision), ear (hearing) taste buds, nose (smell) and skin (superficial receptors).

Health Education -

Brief outline of communicable diseases, Their causative agents, Mode of transmission and Prevention - Chicken pox, Measles, Influenza, Diphtheria, Whooping, cough, Tuberculosis, Poliomyelitis, Hepatitis, Cholera, Typhoid, Food poisoning, Helminthiasis, Malaria, Filariasis, Rabies, Trachoma, Tetanus, Syphilis, Gonorrhoea and AIDS.

Reference / Recommend Books:

1. CC. Chatterjee - Human Physiology (Vol I+II) Central Scientific Boon co.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI**

Semester: 3rd

Subject: Pharmacognosy - II

Total Theory Periods: 40

Total Marks in End Semester Exam: 70

Minimum no. of class tests to be conducted: 2

Branch: B. Pharm

Code: 341315(41)

Total Tut. Periods: 1

Systematic pharmacognostic study of drug like:

Liquorice, Ginseng, Dioscorea, Sarasaparilla, Senega, Digitalis, Squill, Rhubarb, Cascara, Aloe, Senna, Psorelea, Gentian, Saffron, Chirata, Quassia. Dill Fennel, Caraway, Clove, Cinnamon, Nutmeg, Musk, Palmarosa, Gaultheria, Valerian.

Glycosides and Volatile oils:

General methods of classification, isolation, chemical properties and uses.

Biological sources, preparation, identification tests and uses of enzymes:

Diastase, Papain, Pepsin, Trypsin pancreatin. Plant bitters and sweetners.

Studies of traditional drugs like:

Amla, Kantkari, Satavari, Guduchi, Giloya, Punarnava, Chitrak, Apamarg, Gokhru, Shankhpushpi, Adusa, Arjuna, Ashoka, Brahmi, Methi, Lasun, Guggula, Nagarmotha, Neem, Shilajit.

The holistic concept of drug administration in Ayurvedic and Traditional system of medicine.

Introduction to preparations of:

Asava, Arishta, Tailas, Churnas, Lepas, Lehyas and Bhasmas and their evaluation schemes.

Reference / Recommend Books:

1. Shah/Qadry – Pharmacognosy (B S Sahah, Ahmedabad)
2. T E Wallis – TB of Pharmacognosy (CBS New Delhi)
3. Trease/Evans – Pharmacognosy (Jay Perl, ND)
4. Kokate – Purohit – Pharmacognosy (Nirali/Pragati)
5. Handa-Kapoor – Pharmacognosy (Vallabh, ND)

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI**

Semester: 3rd

Branch: B. Pharm

**Subject: Pharmaceutics- III (Pharmaceutical Engineering-I) Practical
341321(41)**

Practical Code:

Total Practical Periods: 3

Total Marks in End Semester Exam: 60

- Exp.1 - Study of psychometric charts.
- Exp.2 - Measurement of pressure by using manometer.
- Exp.3 - Measurement of Reynold's number.
- Exp.4 - Study of different types of valves.
- Exp.5 - Measurement of humidity.
- Exp.6 - Measurement of corrosion.
- Exp.7 - Study of different types of conveyers.
- Exp.8 - Determination of Radiation Constant.
- Exp.9 - Study of the various elements of Computer Aided Manufacturing.
- Exp.10 - Measurement of flow of fluid and their pressure.
- Exp.11 - Study of various types of pumps.
- Exp.12 - Determination of Overall Heat Transfer Coefficient

Reference / Recommend Books:

1. Brown. C.G., et al., Unit Operation, Asia Publishing House Mumbai.
2. K. Sambhamurty, Pharmaceutical Engineering.
3. Caretr. S. J., Cooper, and Gunn's, Tutorial Pharmacy, CBS Publisher, New Delhi.
4. Perry's Chemical Engineer's hand Book.
5. Bentley's Text Book of Pharmaceutics, ELBS London.
5. C.V.S. Subrahmanyam, Pharmaceutical Engineering Principle & Practice, Vallabh Prakashan, New Delhi.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI**

Semester: 3rd

Branch: B. Pharm

Subject: Pharmaceutics- IV (Dispensing And Community Pharmacy) Practical Code: 341322(41)

Practical

Total Practical Periods: 3

Total Marks in End Semester Exam: 60

- Exp.1 - To prepare & submit Emulsions.
- Exp.2 - To prepare & submit Suspensions.
- Exp.3 - To prepare & supply sodium chloride solution.
- Exp.4 - To prepare & supply aqueous iodine solution.
- Exp.5 - To prepare & supply strong ammonium acetate solution.
- Exp.6 - To prepare & supply a carminative mixture.
- Exp.7 - To prepare & supply an expectorant mixture.
- Exp.8 - To prepare & supply a diuretic mixture.
- Exp.9 - To prepare & supply a mixture containing diffusible solid.
- Exp.10- To prepare & supply calamine lotion.
- Exp.11- To prepare & supply salicylic acid & mercuric chloride lotion.
- Exp.12- To prepare & supply camphor liniments.
- Exp.13- To prepare & supply soap liniments.
- Exp.14- To prepare & submit dusting powders for antiseptic.
- Exp.15- To prepare & submit compound powder used as suspending agent.
- Exp.16- To prepare & submit tooth powders (Dentifrices).
- Exp.17- To prepare & supply capsules of acetyl salicylic acid.
- Exp.18- To prepare granules for tablets of compound sodium bicarbonate.
- Exp.19- To prepare & submit emulsifying ointments.
- Exp.20- To prepare & supply cold cream.
- Exp.21- To prepare & supply toothpaste.
- Exp.22- To prepare & submit boric acid suppositories.

Reference / Recommend Books:

1. Caretr. S. J., Cooper, and Gunn's, Dispensing Pharmacy, CBS Publisher, New Delhi.
2. Gennaro, A.R. ed., Remington's. The Science and Practice of Pharmacy,
3. The concise Pharmaceutical Dispensing: Jain & Sharma.
4. Dispensing of Medication: Hoover.
5. Dispensing Pharmacy: R.M. Mehta.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
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Semester: 3rd

Branch: B. Pharm

Subject: Pharmaceutical Chemistry - IV (Organic – II) Practical

Practical Code: 341323(41)

Total Practical Periods: 3

Total Marks in End Semester Exam: 60

- Exp.1 - Identification test for organic compounds.
- Exp.2 - Determination of physical constants of organic compound.
- Exp.3 - Perform the detection of elements.
- Exp.4 - Determine the solubility of organic compounds.
- Exp.5 - Determine the melting & boiling point of the different compounds.
- Exp.6 - Identification test for sulphonamides.
- Exp.7 - Identification test for phenothiazines.
- Exp.8 - Identification test for Amoxicilline.
- Exp.9 - Preparation & submit Aspirin.
- Exp.10- Preparation & submit Oxalic acid.
- Exp.11- Preparation & submit Benzoic acid.
- Exp.12- Determine Saponification value of the given oil or fat.
- Exp.13- Preparation & submit Benzamide.
- Exp.14- Perform the estimation of glucose.
- Exp.15- Perform the estimation of protein.
- Exp.16- Determine the strength of the given glycerine.

Reference / Recommend Books:

1. Organic Chemistry Vol.1 & Vol.2, I.L. Finar.
2. Organic Chemistry, Morrison & Boyd, Prentice hall Pvt. Ltd. New Delhi.
3. Organic Chemistry, Bahl & Bahl.
4. An Introduction to Heterocyclic Compound: Acheson.
6. Bentley Driver's Text Book of Pharmaceutical, A.H. Atherden.
7. Indian Pharmacopoeia.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI**

Semester: 3rd

Branch: B. Pharm

Subject: Anatomy, Physiology and Health Education - II Practical

Practical Code: 341324(41)

Total Practical Periods: 3

Total Marks in End Semester Exam: 60

- Exp.1 - Study of digestive system by the help of charts & models.
- Exp.2 - Study of Respiratory system by the help of charts & models.
- Exp.3 - Study of Central Nervous System by the help of charts & models.
- Exp.4 - Study of Autonomic Nervous System by the help of charts & models.
- Exp.5 - Study of Urinary System by the help of charts & models.
- Exp.6 - Study of Reproductive System by the help of charts & models.
- Exp.7 - Study of Endocrine System by the help of charts & models.
- Exp.8 - Study of Sense Organs by the help of charts & models.
- Exp.9 - Study of the Clinical Features, mode of transmission & prevention of selected communicable diseases from the course contents.
- Exp.10 - Microscopic studies of different tissues of various systems mentioned in the course.
- Exp.11 - Analysis of Normal & Abnormal urine.
- Exp.12 - Estimation of Red Blood Cells count.
- Exp.13 - Estimation of White Blood Cells count.
- Exp.14 - Determination of Erythrocyte Sedimentation rate.
- Exp.15 - To study the experiments on spirometer.

Reference / Recommend Books:

1. Textbook of Practical Physiology, Ranade, V.G., Pune, Vidyarthi Gritha Prakashan, Pune.
2. Human Physiology, Subhash Shalya, CBS Publishers & Distributer.
3. Human Physiology, Vendor, A.J. Sherman J. H. & Luciano.D.S. Tata McGraw Hill Publishing Co., New Delhi.
4. Illustrated physiology, McNaught , A.B. and Callender, R. Churchill Livingstone.
5. Guyton, Textbook of Medical Physiology, A.C. Guyton, W.B. Saunders Company, 1995

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY,
BHILAI**

Semester: 3rd

Subject: Pharmacognosy - II Practical

Total Practical Periods: 3

Total Marks in End Semester Exam: 60

Branch: B. Pharm

Practical Code: 341325(41)

- Exp.1 - Study the Macroscopic & Microscopic Characters of Liquorice.
- Exp.2 - Study the Macroscopic & Microscopic Characters of Digitalis.
- Exp.3 - Study the Macroscopic & Microscopic Characters of Aloe
- Exp.4 - Study the Macroscopic & Microscopic Characters of Senna
- Exp.5 - Study the Macroscopic & Microscopic Characters of Chirata
- Exp.6 - Study the Macroscopic & Microscopic Characters of Dill
- Exp.7 - Study the Macroscopic & Microscopic Characters of Fennel
- Exp.8 - Study the Macroscopic & Microscopic Characters of Clove.
- Exp.9 - Study the Macroscopic & Microscopic Characters of Cinnamon.
- Exp.10 - Study the Macroscopic & Microscopic Characters of Caraway.
- Exp.11 - Study the Macroscopic & Microscopic Characters of Gokhru.
- Exp.12 - Study the Macroscopic & Microscopic Characters of Arjuna
- Exp.13 - Study the Macroscopic & Microscopic Characters of Ashoka.
- Exp.14 - Study the Macroscopic & Microscopic Characters of Neem.
- Exp.15 - Extraction of volatile oils from given drugs.
- Exp.16 - Perform the identification tests of glycosides.

Reference / Recommend Books:

1. Evans, W.C., Trease and Evans Pharmacognosy, ELBS/Balliere London.
2. Kokate, C.K., Pruhit, A.P., Gokhle, S.B., Pharmacognosy, 5th ed., Nirali Prakashan, Pune.
3. Wallis, T.E., Textbook of Pharmacognacy, CBS Publications, New Delhi.
4. Shah, C.S., Quadry, J.S. Textbook of Pharmacognacy, B.S., Shahprakashan, Ahmedabad.
5. Kokate, C.K., Practical Pharmacognacy, Vallabh Prakashan, New Delhi.