

M.Pharm.
Part-I 2010
Part-II 2011

Prospectus No. 101430

संत गाडगे बाबा अमरावती विद्यापीठ
SANT GADGE BABA AMRAVATI UNIVERSITY

आयुर्विज्ञान विद्याशाखा
(FACULTY OF MEDICINE)

अभ्यासक्रमिका
औषधिनिर्माण पदव्युत्तर परीक्षा
भाग-१, २०१० व भाग-२, २०११

PROSPECTUS

OF

MASTER OF PHARMACY (PHARMACEUTICAL CHEMISTRY)

EXAMINATIONS

PART-I, 2010 & PART-II, 2011



2009

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SANT GADGE BABA AMRAVATI UNIVERSITY
SPECIAL NOTE FOR INFORMATION OF THE STUDENTS

(1) Notwithstanding anything to the contrary, it is notified for general information and guidance of all concerned that a person, who has passed the qualifying examination and is eligible for admission only to the corresponding next higher examination as an ex-student or an external candidate, shall be examined in accordance with the syllabus of such next higher examination in force at the time of such examination in such subjects, papers or combination of papers in which students from University Departments or Colleges are to be examined by the University.

(2) Be it known to all the students desirous to take examination/s for which this prospectus has been prescribed should, if found necessary for any other information regarding examinations etc. refer the University Ordinance Booklet the various conditions/provisions pertaining to examinations as prescribed in the following Ordinances-

Ordinance No. 1	:	Enrolment of Students.
Ordinance No.2	:	Admission of Students
Ordinance No. 4	:	National Cadet Corps
Ordinance No. 6	:	Examination in General (relevant extracts)
Ordinance No. 18/2001	:	An Ordinance to provide grace marks for passing in a Head of passing and Improvement of Division (Higher Class) and getting Distinction in the subject and condonation of defficiency of marks in a subject in all the faculties prescribed by the Statute NO.18, Ordinance 2001.
Ordinance No.9	:	Conduct of Examinations (Relevant extracts)
Ordinance No.10	:	Providing for Exemptions and Compartments

Ordinance No. 19	:	Admission of Candidates to Degrees
Ordinance No.109	:	Recording of a change of name of a University Student in the records of the University
Ordinance No. 6 of 2008	:	Improvement of Division/Grade.
Ordinance No.19/2001	:	An Ordinance for Central Assessment Programme, Scheme of Evaluation and Moderation of answerbooks and preparation of results of the examinations, conducted by the University, Ordinance 2001.

J.S.Deshpande
 Registrar
 Sant Gadge Baba Amravati University

#* ORDINANCE NO.17 of 2002

Examination Leading to the Degree of ມາດຕະຖານ ມາດຕະຖານ ມາດຕະຖານ

(Master of Pharmacy)

Whereas, it is expedient to provide ordinance leading to the degree of Master of Pharmacy, for the purpose hereinafter appearing; Management Council is hereby pleased to make the following Ordinance :

1. This Ordinance may be called "Examination leading to the degree of ມາດຕະຖານ ມາດຕະຖານ ມາດຕະຖານ (Master of Pharmacy), Ordinance, 2002".
2. This Ordinance shall come into force with effect from the Academic session 2002-03.
3. In this Ordinance unless the context otherwise requires the expression "Department" shall mean the Department of Pharmaceutical Sciences and "College" shall mean affiliated college approved for conducting M.Pharm.course.
4. The several courses leading to the Degree of ມາດຕະຖານ ມາດຕະຖານ ມາດຕະຖານ (Master of Pharmacy) shall be as follows, namely :
 - I) Pharmaceutics
 - II) Pharmaceutical Chemistry
 - III) Pharmacology
 - IV) Pharmacognosy & Phytochemistry
 - V) Biotechnology
 - VI) Quality Assurance
 - VII) Industrial Pharmacy
 - VIII) Bio pharmaceuticals
5. There shall be two examinations leading to the Degree of ມາດຕະຖານ ມາດຕະຖານ ມາດຕະຖານ (Master of Pharmacy) namely the first examination and Final examination in each of the courses specified in paragraph 4 above. The duration of the course shall be of two Academic years with the M.Pharm. First Examination at the end of first academic year and the M.Pharm.Final Examination at the end of second academic year.
6. The Master of Pharmacy First Examination shall be held in March/April and October/November, and the Final examination in March/April and November/December at such places and on such dates as may be fixed by the Borad of Examination.

Subject to the compliance with the provisions of this ordinance and of other ordinance in force from time to time, an applicant for admission to -

- A) The First M.Pharm. Examinee shall have passed not less than one academic year previously the B.Pharm.examination of this University or of any other university recognised as equivalent thereto and shall have prosecuted a regular course of studies in the department/college as prescribed in this ordinance.
 - B) The Final M.Pharm. Examinee shall have passed the First M.Pharm. Examination of this university, and shall have prosecuted a regular course of study in the Department/College as prescribed in this ordinance. An applicant for the examination to the Final M.Pharm. shall not be allowed to take the examination if he/she fails to submit to his/her dissertation on or before the 20th December or 31st May of the calender year in which he/she has to take the examination.
7. A) Without prejudice to the other provision of ordinance No.6 relating to the examination in general, the provisions of paragraphs 5,8,10,26 and 31 of the said ordinance shall apply to every collegiate candidate.
 - B) An unsuccessful examinee at the First M.Pharm.Examination, may be allowed to carry out his research work for dissertation for Final M.Pharm. examination but shall not be permitted to appear for the M.Pharm. examination unless he/she passes in all the papers and practicals prescribed for First M.Pharm. examination.
 8. The fee for each examination shall be as fixed by the University.
 9. The sessionals, papers, practicals, dissertation, and viva-voce, and 2 seminar if any, in which a candidate is to be examined, the maximum marks which each of the subject carries and the minimum marks which an examinee must obtain in order to pass the examination shall be as indicated in the respective annexures.
 10. The scope of the subject shall be as indicated in the syllabus.
 11. An examinee passing in a subject shall be exempted from appearing that subject at all subsequent examinations.
 12. i) An examinee for the final M.Pharm. examination shall carry out research for not less than six months under an approved guide who shall be the internal examiner. A person from industry or Research Institute possessing Post-Graduate qualification in Pharmaceutical Science in appropriate subject and not less than 5 yrs. experience in an industry or Research Institute in a responsible capacity may also be considered for appointment as guide/co-guide/Internal/External examiner
 - ii) The examinee shall submit three copies of this dissertation to

**MASTER OF PHARMACY
IN INDUSTRIAL PHARMACY**

I. FIRST EXAMINATION

Sr.No.	Subject/Paper	Maximum marks			Minimum marks for passing
		Sessional	Paper	Total	
1	CP-1 Biostatistics & Research Methodology	20	80	100	50
2	CP-2 Product Development and Formulation	20	80	100	50
3	IP-1 Advanced Industrial Pharmacy-I	20	80	100	50
4	IP-2 Advanced Industrial Pharmacy-II	20	80	100	50
5	IP-3 Industrial Process Validation and Production Management	20	80	100	50
6	IP-4 Selected Topics in Industrial Pharmacy	20	80	100	50
7	IP-5 Practicals in Industrial Pharmacy	20	80	100	50
				700	

II. FINAL EXAMINATION:

IP-6	Dessertation & Viva-voce	250	125
IP-7	Seminar	50	25

300

Note :

- All theory papers shall be of three hours duration.
- All practical examination shall be of 12 to 16 hr. spread over two days.
- The sessional marks in the theory will normally based on one test conducted at the end of Academic year but before the final examination and in practicals on evaluation of the experiments done during the academic year (10 marks) and tests conducted (10 marks) at the end of the academic year but before the final examination by the teachers in the department/college.
- In Order to pass, the examinee must obtain the minimum pass marks as above.
- The dissertation shall commence in the first year and shall be evaluated during the second year.

**Master of Pharmacy
Pharmacognosy and Phytochemistry**

I. FIRST EXAMINATION

Sr.No.	Subject/Paper	Maximum marks			Minimum marks for passing
		Sessional	Paper	Total	
1.	CP-1 Biostatistics & Research Methodology	20	80	100	50
2.	CP-2 Product Development and Formulation	20	80	100	50
3.	PG-1 Advanced Pharmacognosy I	20	80	100	50
4.	PG-2 Advanced Pharmacognosy II	20	80	100	50
5.	PG-3 Standardization of Herbal Products	20	80	100	50
6.	PG-4 Selected topics in Pharmacognosy & Phytochemistry	20	80	100	50
7.	PG-5 Practicals in Pharmacognosy & Phytochemistry	20	80	100	50
				700	

II. FINAL EXAMINATION:

PG-6	Dessertation & Viva-voce	250	125
PG-7	Seminar	50	25

300

Note:

- All theory papers shall be of three hours duration.
- All Practical examination shall be of 12 to 16 hrs spread over two days.
- The Sessional marks in the theory will normally based on one test conducted at the end of Academic year but before the final examination and in Practical on evaluation of the experiments done during the academic year (10 marks) and tests conducted (10 marks) at the end of the academic year but before the final examination by the teachers in the department / college.
- In Order to pass, the examinee must obtain the minimum pass marks as above.
- The dissertation shall commence in the first year and shall be evaluated during the second year.

SANT GADGE BABA, AMARAVATI UNIVERSITY
Master of Pharmacy
Pharmaceutics

I. FIRST EXAMINATION

S.N	Code	Subject/Paper	Maximum marks			Minimum marks for passing
			Sessional	Paper	Total	
1	CP1	Biostatistics and Research Methodology	20	80	100	50
2	CP2	Product Development and Formulation	20	80	100	50
3	P1	Advanced Physical Pharmacy	20	80	100	50
4	P2	Biopharmaceutics and Pharmacokinetics	20	80	100	50
5	P3	Pharmaceuticals Dosage Form Technology	20	80	100	50
6	P4	Selected Topics in Pharmaceutics	20	80	100	50
7.	P5	Practicals in Pharmaceutics	20	80	100	50
					700	

II. FINAL EXAMINATION

P6	Dissertation and Viva-voce	250	125
P7	Seminar	50	25
		300	

Note:

1. All theory papers shall be of three hours duration.
2. All practical examination shall be of 12 to 16 hours spread over two days.
3. The Sessional Marks in the theory will normally based on the test conducted at the end of academic year but before final examination and Practicals on evaluation of experiments done during academic year (10 Marks) and test conducted (10 Marks) at the end of academic year but before the final examination by the teachers in department/college.
4. In order to pass, the examinee must obtain the minimum pass marks as above.
5. The dissertation shall commence in the first year and shall be evaluated during second year.

**MASTER OF PHARMACY
(PHARMACEUTICAL CHEMISTRY)**

I. First Examination

S. No.	Code	Subject/Paper	Max marks			Minimum marks for passing
			Sessional	Paper	Total	
1	CP1	Biostatistics and Research Methodology	20	80	100	50
2	CP2	Product Development and Formulation	20	80	100	50
3	PC1	Advanced Pharmaceutical Chemistry I (Reaction Mechanism)	20	80	100	50
4	PC2	Advanced Pharmaceutical Chemistry II (Medicinal Chemistry)	20	80	100	50
5	PC3	Advanced Pharmaceutical Chemistry III (Instrumental Analysis)	20	80	100	50
6	PC4	Selected Topics in Pharmaceutical Chemistry	20	80	100	50
7	PC5	Practicals in Pharmaceutical Chemistry	20	80	100	50
			700			

II. Final Examination

	PC6	Dissertation & viva - voce		250	125
	PC7	Seminar		50	25
Total				300	

Note:

- All theory papers shall be of three hours duration.
- All Practical examination shall be of 12 to 16 hrs spread over two days.
- The Sessional marks in the theory will normally based on one test conducted at the end of Academic year but before the final examination and Practical on evaluation of the experiments done during the academic year (10 marks) and tests conducted (10 marks) at the end of the academic year but before the final examination by the teachers in the department / college.
- In Order to pass, the examinee must obtain the minimum pass marks as above.
- The Dissertation shall commence in the first year and shall be evaluated during the second year.

No.: 28/2008

Date : 14 /10/ 2008

Subject : Scheme of Examination for M.Pharm. (Quality Assurance) & M.Pharm. (Pharmacology)

Whereas, the Ordinance No.17 of 2002 in respect of Examination leading to the Degree of भेषजी पारंगत (Master of Pharmacy) is in existence.

AND

Whereas, the Govt. of Maharashtra, Department of Higher and Technical Education, vide its letter No./टिईएम २००८/(३४३/०८)/तांशि-१, Dt.31.07.2008 has granted permission to start the M.Pharm. (Quality Assurance) course at Pataldhamal Wadhvani College of Pharmacy, Yavatmal and M.Pharm. (Pharmacology) course at Anuradha College of Pharmacy, Chikhali from the Academic Session 2008-09.

AND

Whereas, the Academic Council has taken policy decision in its meeting held on 10.04.2008 vide item No.19 that, while appointing enquiry committee for granting affiliation to any new subject/course, firstly the syllabi of the concerned course should be prepared by the Board of Studies / Ad-hoc Committee.

AND

Whereas, in the light of above decision of Academic Council, the B.O.S. in Pharmaceutical Sciences in its meetings held on 25.08.2008 & 1.9.2008 has prepared and recommended the schemes of examinations, draft syllabi alongwith other details for M.Pharm.(Quality Assurance) & M.Pharm. (Pharmacology) respectively.

AND

Whereas, the schemes of examinations for M.Pharm.(Quality Assurance) & M.Pharm. (Pharmacology) are to be made available from the Academic Session 2008-2009.

AND

Whereas, the Hon'ble Vice-Chancellor has accepted the schemes of examinations and syllabi for M.Pharm.(Quality Assurance) & M.Pharm. (Pharmacology) course alongwith other details under sub-section (7) of section 14 of the Maharashtra Universities, Act, 1994, on 21/9/2008 on behalf of faculty of Medicine (including Pharmaceutical Sciences, Dentistry & Homoeopathy) & Academic Council.

AND

Whereas, the schemes of examinations are the part of Ordinance in respect of Examination leading to the Degree of भेषजी पारंगत (Master of Pharmacy), Ordinance 2002, i.e. Ordinance No.17 of 2002, in which necessary amendments are to be made.

AND

Whereas, making amendments in the said Ordinance i.e. Ordinance No.17 of 2002 in respect of Examinations leading to the Degree of भेषजी पारंगत (Master of Pharmacy), Ordinance 2002, is a time consuming process.

Now, therefore, I, Dr. Kamal Singh, Vice-Chancellor of Sant Gadge Baba Amravati University, in exercise of powers conferred upon me under sub-section (8) of section 14 of the Maharashtra Universities Act., 1994, do hereby direct as under:

1. This Direction may be called "Examinations leading to the Degree of भेषजी पारंगत (Master of Pharmacy), Direction, 2008".
2. This direction shall come into force from the date of its issuance.
3. The Schemes of examinations for Examinations leading to the Degree of भेषजी पारंगत (Master of Pharmacy) i.e. M.Pharm.(Quality Assurance) & M.Pharm. (Pharmacology) shall be as per Annexure-I & Annexure-II respectively, annexed with this Direction.

Amravati
Dated : 06/10/2008

Sd/-
(Kamal Singh)
Vice-Chancellor

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI
MASTER OF PHARMACY
QUALITY ASSURANCE

I FIRST EXAMINATION

S.N.	Code	Subject / Paper	Maximum Marks			Maximum Marks for Passing
			Sessional	Paper	Total	
1	CP1	Biostatistics and Research Methodology	20	80	100	50
2	CP2	Product Development and Formulation	20	80	100	50
3	QA1	Modern Analytical Technique in Pharmaceutical Research	20	80	100	50
4	QA2	Quality Assurance & Management	20	80	100	50
5	QA3	Advances in Pharmaceutical Sciences	20	80	100	50
6	QA4	Selected Topic in Quality Assurance	20	80	100	50
7	QA5	Practicals in Quality Assurance	20	80	100	50
Total					700	

II FINAL EXAMINATION

QA6	Dissertation and Viva- Voce	250	125
QA7	Seminar	50	25
Total		300	

Note -

1. All Theory papers shall be of three hours duration.
2. All practical examination shall be of 12 to 16 hours spread over two days.
3. The Sessional Marks in the theory will normally be based on the test conducted at the end of academic year but before final examination and practical on evaluation of experiments done during academic year (10Marks) and test conducted (10 Marks) at the end of academic year but before the final examination by the teachers in department /college.
4. In order to pass, the examinee must obtain the minimum pass marks as above.
5. The dissertation shall commence in the first year and shall be evaluated during second year.

SANT GADGE BABA AMRAVATI UNIVERSITY, AMRAVATI
MASTER OF PHARMACY
PHARMACOLOGY

FIRST EXAMINATION

Sr. No.	Code	Subject/Paper	Maximum Marks			Minimum marks for passing
			Sessional	Paper	Total	
1.	CP-1	Biostatistics and Research Methodology	20	80	100	50
2.	CP-2	Product Development and Formulation	20	80	100	50
3.	PL-1	Advanced Physiology	20	80	100	50
4.	PL-2	Advanced Pharmacology	20	80	100	50
5.	PL-3	Biological Evaluation Methods and Toxicology	20	80	100	50
6.	PL-4	Selected Topics in Pharmacology	20	80	100	50
7.	PL-5	Practicals in Pharmacology	20	80	100	50
					700	350

FINAL EXAMINATION

PL-6	Dissertation and Viva-voce	250	125
PL-7	Seminar	50	25
		300	150

Note -

1. All Theory papers shall be of three hours duration.
2. All practical examination shall be of 12 to 16 hours spread over two days
3. The Sessional Marks in the theory will normally be based on the test conducted at the end of academic year but before final examination and practical on evaluation of experiments done during academic year (10Marks) and test conducted (10 Marks) at the end of academic year but before the final examination by the teachers in department/college.
4. In order to pass, the examinee must obtain the minimum pass marks as above.
5. The dissertation shall commence in the first year and shall be evaluated during second year.

**SYLLABUS PRESCRIBED FOR
THE EXAMINATION OF THE DEGREE OF
MASTER OF PHARMACY
IN PHARMACEUTICAL CHEMISTRY**

I. FIRST EXAMINATION

CP-1 : BIostatISTICS AND RESEARCH METHODOLOGY.

SECTION-A

The following topics in the subject covered by Sanford Bolton in Pharmaceutical Statistics-Practical and Clinical Applications, Marcel Dekker, Inc., New York, 1990, will be dealt with:

Basic Definitions and concepts, Data Graphics, The Binomial and Normal probability Distributions, Sampling, Estimation and Hypothesis Testing, Sample size and power, Linear Regression and Correlation, Analysis of variance, Factorial Designs, Transformations and outliers, Experimental Design in Clinical Trials, Quality Control, Validation, Consumer Testing, Nonparametric Methods and Optimization Techniques.

COMPUTER APPLICATIONS IN PHARMACY :

Introduction to computers, Programming languages, flow charting and system analysis-A review, Applications of LOTUS 1-2-3 and dBASE (III,IV) Strategy for building of Pharmacokinetic models, study of Computer software like AUTOAN 1, AUTOAN 2, CSTRIP, NONLIN, MACDOPE, etc., An approach to computer aided drug design.

Reference Books :

1. Buncher, C.R. and Jia-Yeong Tsay, Statistics in the Pharmaceutical Industry, Marcel Dekker Inc.
2. Peace, K.E., Biopharmaceutical Statistics for Drug Development. Marcel Dekker Inc.
3. Berry, D.A., Statistical Methodology in pharmaceutical Sciences, Marcel Dekker Inc.
4. Peace, K.E., Statistical Issue in Drug Research and Development, Marcel Dekker Inc.
5. Bergman, S.W., Statistical Methods for Pharmaceutical Research and planning, Marcel Dekker Inc.
6. Daniel, W.W., Biostatistics.
7. Fassett, W.E. and Christensen, D.B., Computer Applications in Pharmacy.
8. Gilbert, C and Williams, L., The ABC's of 1-2-3, B.P.B. Publications.
9. Simpson, Introduction to dBASE III +; B.P.B. Publications.
10. Naiman, An Introduction to Wordstar; B.P.B. Publications.

I Research :

1. Meaning of Reseach, Purpose of Research, Types of Research (Educational, Clinical, Experimental, Historical, Descriptive, Basic applied and Patent Oriented Research) - Objective of research-
2. Literature Survey- Use of Library, books & journals-Medline-Internet, getting patents and reprints of articles as sources for literature survey.
3. Selecting a problem and preparing research proposal for different types of research mentioned above.
4. Methods and tools used in Research.
 - Qualitative studies,Quantitative Studies
 - Simple data organisation, Descriptive data analysis
 - limitations and sources of Error
 - Inquiries in form of Questionnaire, Opinionnaire or by interview.
 - Statistical Analysis of data including variance, standard deviation, student 't' test and annova, correlation data and its interpretation, computer data analysis
5. Documentation
 - "How" of Documentation
 - Techniques of Documentation
 - Importance of Documentation
 - Uses of Computer packages in Documentation
6. The Research Report/Paper writing/thesis writing
 - Different parts of the Reseach paper
 - 1. Title-Title of project with author's name
 - 2. Abstract-Statement of the problem, Background list in brief and purpose and scope.
 - 3. Key-words-
 - 4. Methodology - Subject, Apparatus/Instrumentation, (if necessary) and procedure.
7. Results- Tables,Graphs, Figures and statistical presentation
8. Discussion - Support or non-support of hypothesis
 - practical & theoretical implications,
 - conclusions
9. Acknowledgements
10. References
11. Errata

12. Importance of spell check for Entire project.

13. Use of footnotes

II Presentation (specially for oral)

Importance, types, different skills.

- Content of presentation, format of model.
- Introduction and ending
- Posture, Gestures, Eye contact, facial expressions, stage fright
- Volume-pitch, speed, pause & language
- Questionnaire

III Protection of patents and trade marks. Designs and copyrights

- The patent system in India - Present status Intellectual property Rights (IPR), Future changes expected in Indian Patents.
- Advantages
- The science in law. Turimetrics (Introduction)
- What may be patented
- Who may apply for patent
- Preparation of patent proposal
- Registration of patents in foreign countries and vice-versa

IV Cost Analysis of the Project

- Cost incurred on Raw Material
- Cost incurred on Procedure
- Cost incurred on Instrumentation
- Cost incurred on Clinical trials

V Sources for procurement of Research Grants**VI Industrial-Institution Interaction**

- Industrial projects- Their feasibility reports

Books

1. Research in Education - John V. Best, James V. Kahn
2. Presentation skills - Michael Halton - Indian Society for Institute Education.
3. A Practical Introduction to copy right - Gavin Mcfarlane
4. Thesis projects in Science and Engineering - Richard M.Davis
5. Scientists in legal system - Ann labor science
6. Thesis and Assignment wirting - Jonathan Anderson
7. Writing a technical paper - Donald Menzel
8. Effective Business Report writing - Leland Brown
9. Protection of Industrial property rights- Purushottam Das and Gokul Das

10. Spelling for the millions - Edna Furrness
11. Preparing for publication - King Edwards Hospital fund for London
12. Information technology - The Hindu speaks
13. Documentation - Genesis & Development 3792
14. Manual for evaluation of Industrial projects - United Nations
15. Manual for the preparation of Industrial feasibility studies

CP-2 : PRODUCT DEVELOPMENT AND FORMULATION

INTRODUCTION OF NEW DRUGS:

Steps involved in the development of a new drug, obstacles to its evaluation, limitations of screening procedures, animal toxicity tests. Extrapolation of laboratory data to man, placebo, New drug application as per WHO norms and proforma. Requirement and guidelines on clinical trials for import and manufacture of new drugs in India.

PREFORMULATION STUDIES :

Investigation of physical and chemical problems inherent in the development of new formulations.

PHYSICAL PROPERTIES :

Organoleptic properties, microscopy, intrinsic solubility and dissolution rate; powder flow and compression, properties and physical stability.

CHEMICAL PROPERTIES :

Chemical properties : Purity, physico-chemical parameters affecting absorption, solid state and solution-phase stability and compatibility with excipients. Formulation additives : Studies on all excipients to be incorporated in the development of liquid orals, solid dosage forms. Stability data : Advanced studies on stability and development of stability data on different formulations.

PROCESS VALIDATION :

Development of validation data on different formulations, Quality assurance and GMP : A Detailed study of current good manufacturing practices in manufacturing, processing, packaging and holding of drug.

Product development approach on following formulations :

LIQUID ORALS :

Cough and multivitamin syrup, antifatulant and laxative emulsions, antacid and antidiarrhoeal suspensions.

TOICALS :

Antibiotic ointment, analgesic gels.

TABLETE :

Common cold, multivitamin, chewable antacid, soluble aspirin and dispersible/kid tablets.

STERILE DOSAGE FORMS :

B-complex injection, antibiotic eye and ear drops, antihistaminic nasal drops.

Reference Books :

1. Gennaro, Remingtons Pharmaceutical Sciences, Mack Publishing Co.
2. Lachman, Theory and practice of Industrial pharmacy, Lea and Febiger.
3. Ansel., Pharmaceutical Dosage Forms & Drug Delivery Systems, Lea & Febiger.
4. Banker, Modern Pharmaceutics, Marcel Dekker Inc.
5. Racz, Drug Formulation, John Wiley and Sons.
6. Aulton, Pharmaceutics : The Science of Dosage Forms Design, ELBS, London
7. Wells, Pharmaceutical preformulation: The physico-chemical properties of Drug Substance, Ellis Horwood Ltd.
8. Florence, Atwood, physico-chemical Principles of pharmacy, Chapman and Hall NY.
9. Welling and Tuckerman, Good Manufacturing practices : A plan for Total Quality Control, Bhalani Publishing House, Bombay.
10. Connors, Chemical stability of pharmaceuticals : A Handbook for pharmacists, Wiley Inter-Science.
11. Carstensen, Drug Stability : Principles and practices, Marcel Dekker Inc.

PC-1 ADVANCED PHARMACEUTICAL CHEMISTRY I (REACTION MECHANISM)

1 Stereochemistry

Stereochemistry of carbon compounds (mainly based on the textbook by Eliel) molecular dissymetry, racemic modification (Properties and resolution) confirmation and reactivity in acyclic compounds, conformational effects in six membered heterocyclic rings, Stereo specific and stereo selective synthesis, Bayers strain theory.

2 Reaction Mechanism (including stereochemistry)

Aromatic electrophilic and nucleophilic substitution reaction, carbonium ions, carbanions, their generation stability and fate, rearrangements due to electron deficient atoms, Wagner-merwein and related reactions, Pinacol-pinacolone, Favorskii rearrangement, Arndt-Eistert synthesis, benzil-benzilic acid rearrangement, Hofmann rearrangement, Curtius rearrangement, Schmidt reaction, Beckmann rearrangement, Lossen rearrangement, Claisen rearrangement, Cumin

hydroperoxide rearrangement.

Study of the reaction mechanism / Mechanisms and stereochemistry of elimination reactions Hofmann and saytzeef elimination, hydrolysis, esterification,

3. Oxidation and Reduction reactions :-

Oxidation reaction involving use of potassium permanganate, potassium dichromate, chromic acid, and oppenaur oxidation, reduction reaction using metal & acid, hydrogenation of double bond and aromatic rings, Meerwein- Ponderoff-Verley reduction

4. Chemistry of Natural Products:-

Isolation, Purification, and structure elucidation of Reserpine, Morphine, Oxytocine, and Digitoxin, Alkaloids & Glycosides.

5) Study of Biogenic pathway of therapeutically important active constituent of plant origin. Techniques to investigate biogenic pathways.

REFERENCE BOOKS :

1. E.L. Eliel stereochemistry of carbon compounds Mc-Graw Hill
2. Potapov stereochemistry Mir Publishers.
3. Advances in Drug Research [Series] Academic press.
4. Fergusson Modern structural Theory of organic chemistry Prentic Hall
5. J. March Advanced organic chemistry, Reaction Mechanism and structure, Mc Graw Hill
6. E.S. Gould Mechanism and structure in Organic chemistry, Holt Reinhart and winston New York.
7. Floring and Stotx comprehensive Biochemistry [Seriur] Elsevier
8. Burgers Medicinal chemistry, M.E Wolf [Ed] wiley Intersuinie.
9. Norman Principles of organic synthesis Metheun
10. Medicinal chemistry, Monographs series Academic Press.
11. Bently Techniques of organic chemistry Weigs berger series Vol XI
12. Natural Product by Finar
13. Chemistry of Natural Product by Gurudeep Chatwal.
14. Organic chemistry by Morrison and Boyd.
15. Monske - the alkaloid chemistry & physiology
16. Sim - Medicinal plant glycosides .
17. Pridham - Swain - biosynthetic pathway in higher plant .

PC2- ADVANCED PHARMACEUTICAL CHEMISTRY-II (MEDICINAL CHEMISTRY)

- 1) In organic chemistry the following name reaction and molecular rearrangement will be discussed in details with reference to their application in the synthesis of some medicinal agent .

a) Claisen - Schmidt reaction eg sulfisoxazole

b) Perkins reaction eg sulinadac

c) Mannich reaction eg Tolmetin ,Atropine, Ethacrinic acid, Dextropropoxyphen

d) Oppenaur oxidation -

2. Drug Design QSAR and mechanism based approaches, computer aided drug design and molecular modeling in drug distribution and drug availability physicochemical factors in biological activity as partition coefficients electronic factors, pH, various parameters and their applications.
3. Steric factors conformational isomerism, chemical isomerism, bioisosterism, optical activity .
4. Agonists and Antagonists chemical competitive and functional Antagonists, structural relations of agonists and antagonists.

A short review of successful drug development through molecular manipulation with illustrative examples of Antihypertensives, Antimalarial, Penicilins, sulfa drugs. Recent advances in medicinal chemistry with particular emphasis including its SAR, Mechanism of action, synthesis. on the following topics. agents, Antibiotics like cephalosporin, Polypeptides, Macrolides etc. Antivirals (including AIDS and agents affecting immune response) Antineoplastic and Antiinflammatory agents Antihistaminics.

REFERENCE BOOKS.

1. Burgers Medicinal chemistry M.E. Wolff [ed] John wiley and sons New York.
2. Advances in Drug Research Series Academic Press.
3. Butterworth's Progresses in Medicinal chemistry series.
4. A Medicinal chemistry by Wilson and Grisvold.
5. Thomas J. Perun C,K, Oriost, Cinoyter Auded Drug Design Marcel Dekker Inc New York.

PC-3 ADVANCED PHARMACEUTICAL CHEMISTRY III (INSTRUMENTAL ANALYSIS)

A) Separation Technique -

- 1) Basic principle application & recent trend in Chromatography
 - i) Gas Chromatography
 - ii) HPLC
 - iii) HPTLC
 - iv) Chiral Chromatography
 - v) Ion pair chromatography

B) Spectroscopic Technique -

- 1) Theory of UV, IR, Derivative spectroscopy including FT-IR and their application to structural elucidation.
- 2) Theory & Instrumentation of NMR and C-13 NMR. Their application to structure elucidation
- 3) Basic principle & application of Mass spectrometry.
- 4) X-ray diffractions & X-ray Emission Methods .
- 5) Optical Rotators dispersion (ORD) circular dichroism (CD)
- 6) Atomic Absorption spectroscopy

C) Electro analytical Technique -

- 1) Pulse Polarography
- 2) Chronoamperometry
- 3) Electrophoresis
- 4) Electrogravimetry & coulometry

D) Thermal Method -

- 1) Thermogravimetry
- 2) Differential thermal analysis (DTA)
- 3) Differential Scanning calorimetry (DSC)

REFERENCE BOOKS.

1. A.H. Beckett and J.B. Stenlake, Practical Pharmaceutical chemistry, Part-II The Athlone Press university of London, London
2. K.A. Connors, T.B. of Pharmaceutical Analysis of Drug, John Wiley Inter science.
3. L.G. Chatten, T.B. of Pharmaceutical chemistry, Vol.II Marcel Dekkar New York.
4. Willard, Instrumental Methods of Analysis, Van Nostrand comp.
5. Florey , Analytical Profiles of Drugs Substances series, Academic Press.
6. B.K. Sharma Instrumental Methods of chemicals Analysis 16th Edition, Goel Publishing House Meerut.

PC-4SELECTED TOPICS IN PHARMACEUTICAL CHEMISTRY**1. Development of Analytical method and method validation**

Introduction, protocol, Protocol validation including precoretten protocol, protocol validation method. development available facilities stages in the design of an assay or test statement of problem choice of method, availability of sample, instrumental aspect, secondary optimization specification use of computers and internal facilities in the analytical method development of drugs, computer and documentation.

2 Quality control of packaging material

- Classification into primary and Rounder materials toxicity testing.
3. Role of pharmaceutical analyst in bio equivalence bioavailability, Techniques guidelines of USFDA.
4. Regulatory considerations, Registration requirement of quality for New Drugs, Generics and patent Drugs, International harmonization.
5. Radioimmunoassay of selected drugs and hormones ELISA and Western Blot Technique.
6. Analysis of drugs in multi ingredient pharmaceutical formulation containing vitamin, sulpha drugs. antihistaminics , analgesics/ antipyretics, anti-inflammatory agents etc.
Theoretical basis of newer drug delivery system.

REFERENCE BOOKS:-

1. Quality Assurance of drugs in pharmaceuticals by P.D.Sethi.
2. Stability testing of dully products.
3. Impurities Evaluation of Pharmaceuticals by Satinder Ahuja.
4. Novel Drug Delivery system by Robinson and lee.
5. Novel drug delivery system by Chen
6. Frank J.Welcher, D.Van N. Strand [Ed] standard method of chemical analysis.
7. W.B. Deichman and H.;W. Gerade Toxicology of Drugs and chemicals Academic press.

PC -5 PRACTICALS IN PHARMACEUTICAL CHEMISTRY.

1. Analysis of drug combinations as cough mixtures, analgesic antipyretic, Antihistaminics, sulfonamide mixtures, steroid combinations.
2. Separation (including multicomponent mixtures) Characteristics and identification by classical & modern methods of chromatography, spectroscopic data, derivative formation etc.
3. Interpretation of UV and IR spectra of some unknown chemicals & drugs.
4. Detection and determination of Arsenic, Lead, Mercury, Cyanide in biological samples.
5. Determination of barbiturates, sulfonamides amphetamine, atropine etc. in blood & Urine sample.
6. Analysis of sample of cream for active constituents and absorption capacity etc.
7. Estimation of sample of paste for active constituent, preservative, consistency, water insoluble solid particle size etc.
8. Analysis of fats.
9. Determinations of volatile oil, alcohol.

10. Estimation of methyl alcohol in presence of ethyl alcohol.
- 11 Two step synthesis of phenytoin, Benzoic Acid.
- 12 Synthesis undergoing Diazotisation, Beckman rearrangement, Cannizzaro's reaction Clemmensen reduction, Leuckart reaction, Fischer Indole synthesis
13. Isolation of active plant principles (e.g. alkaloids, steroids) from natural origin.
14. Determination of partition coefficient, stearic features and ionization constants of drug molecules.
15. Laboratory scale preparation of following compounds like cinnamic acid Anthranctic acid Benzanilide, Benzhydrol, 8-hydroxy quinoline
- 16 Assay of enzyme containing formulations (Pancreatin NF or Alpha amylase I.P.)
17. Drugs estimated officially by solvent extraction methods eg nasal drops, sodium benzoate.

REFERENCE BOOKS:

1. Bentley and Draws Textbook of P' chemistry.
2. Garrett the quantitative analyses of drug.
3. Latest editions of I.P., USP, B.P, European pharmacopoeia and International pharmacopoeia.
4. Florey Analytical profiles of Drugs substance.
5. Juran quality control Handbook.
6. Mann and saunders Practical organic chemistry
7. Vogel Practical organic chemistry.

II. FINALEXAMINATION

PC-6 : DESSERTATION :

Every student for the degree of master of pharmacy shall be required to undertake a project involving Methodical / Scientific Research under the supervision of an approved guide and submit three copies of the report on the project, duly certified by the supervisor to the Head of the Department, Principal. The work shall be conducted in accordance with the provision of para 13 of the ordinance.

PC-7 : SEMINAR

The candidate shall deliver seminars during the session, on selected topics of current research interest as in the journals in the field of his specialisation. Viva-voce examination shall consist of the candidate during such seminars and his overall proficiency in the principles and practice of pharmaceutical sciences.