JSS Academy of Higher Education and Research

JSS College of Pharmacy

Sri Shivarathreeshwara Nagara, Mysuru-570015

Ph: 0821-2548353, Fax: 0821-2548359, Email: jsscpmy@jssuni.edu.in

Website: www.jssuni.edu.in

An ISO 9001:2015 Certified Institution

(DEEMED TO BE UNIVERSITY) JSS ACADEMY OF HIGHER EDUCATION & RESEARCH MYSURU

B. Pharm – VII Semester
Course Handout
2020-21

Accredited 'A+' Grade by NAAC	**1st in Karnataka & 3rd in INDIA to be rated with 4 stars**	**Ranked 1st among the YOUNG UNIVERSITIES in Karnataka**	**JSS College of Pharmacy, Mysuru – 10th Rank in INDIA 2020**	INTERNATIONAL CERTIFICATION Pharm D Program is Certified by Accreditation Council for Pharmacy Education (ACPE), USA

ARIIA ATAL RANKING OF INSTITUTIONS ON INNOVATION ACHIEVEMENTS

Ranked 4th in India for 2019

Academic Calendar 2020-21
(B.Pharm - VII Semester)

Teacher's Incharge

Class	Class Teacher	Batch No.	Batch Teacher
IV B.Pharm (VII Semester)	Dr. M.P. Gowrav	I	Dr. R.S.Chandan
		II	Dr. Vikas Jain
		III	Dr. Umesh M
		IV	Dr. M.P. Gowrav

ACTIVITIES AND COORDINATORS 2020-21

Curricular & Co curricular activities

Sl. No	Activities	Coordinator/s
1.	Induction, learning skills and personality development programs for fresher's	DHP/MPG
2.	Selection of class representative in first week of commencement of each course	
3.	Anti ragging cell	HP/ BM
4.	Grievance and redressal cell	PKK
5.	Industrial Visits, Training and placements	TS/ABP
6.	Guest lectures & Seminars/ conferences/ training / workshop • organized at college • delivered/attended by staff	Respective department all HODs
7.	Internal Assessment Committee Chairperson Members	 GVP RSS/SNM/DAT/BMV
8.	• Academic Council Board • Identification of Advanced/ Medium/ Slow learners	Class Teachers Subject Teachers
9.	Ethics committee Meeting • Animal • Human	 KLK MR
10.	Time table	DHP TS/ URR/ VR/AMM/HYK
11.	Internal Quality Assurance Cell Chairperson Members	 PKK/ AMM/AKT/HVG/SP
12.	Women's cell (Prevention of Sexual Harassment	SNM

	Cell)	
13.	Scholarship Bureau	RSC
14.	Compilation of publications (Research papers/books/chapters)	BMG
15.	Research Coordination Committee -Compilation of Ph.D details and funded projects - Plagiarism - Review of publications	Chairperson – DVG Members – BRP/SB/JS
16.	Pharmacy Education Unit (CCLPE)	PKK/KU/RSS
17.	Annual result analysis List of merit students	UG – Subject Teacher, Class teacher & Program committee PG – Course Coordinator & Abhishek (Office)
18.	GPAT and other competitive exams (TOEFL, GRE etc.)	BM/ CSH/MPG
19.	Library orientation	Librarian
20.	Soft Skills Training	ABP

Extracurricular activities

Sl. No.	Activities	Coordinator/s
21.	• Selection of Class Representatives, Pharmaceutical society members • Annual planning and execution of Student centered and professional activities including inauguration of IPS	MSS/ SRD
22.	JASPHARM	BS/ SM / CSH
23.	STUMAG	HYK
24.	Sports coordinators	MPV/HKS
25.	NSS coordinators	MPG / UM/ SND
26.	Cultural & Literary coordinators	KNS/CI

Other Institutional activities

Sl. No.	Activities	Coordinator/s
27.	Annual Day celebration / Graduation day	DAT/SM
28.	Course handouts/ Teachers diary/ Student handbook/Faculty handbook	HYK/PS
29.	National Pharmacy Week (NPW) & Pharmacists Day	VJ/ UM + IPA team
30.	Alumni association	HVG/ AKT/SM/BS
31.	Herbal and College Garden	JS/ NPK/VR
32.	ISO	DHP/SNM

33.	Press and publicity	KLK /BMV/OFFICE
34.	Foreign students cell	MPV
35.	Governing council meeting	JUS/ Office
36.	Monthly/Annual report of college activities to JSS AHER and other agencies	HoDs/JUS/ST/AKT/AM/KU/NPK Asha (office)
37.	College website	HKS/KU
38.	Research & Consultancy Co-ordinator • Collaboration with Industries/organizations • Interdepartment/Interdisciplinary research	DVG/ SB/ KM
39.	Coordinator - JSSUonline.com	ABP/TS
40.	JSSU Newsletter	KLK SRD/ KNS
41.	Annual group photo session	MSS/ SRD
42.	Lab coat and Blazers	JS / Ningaraju
43.	Notice Board (SNB, LNB and IIPC), Departmental staff list	Nagaraju
44.	Stock verification	Office staff /Librarian
45.	Student Liaison	Divya S
46.	Student ID Cards /Attendance entry	Shivanna / Manjunath
47.	Retreat for Pharmacy Students	AKT/ HKS/BRJ
48.	Feedback	VJ
49.	Institute Innovation Cell	HVG/PKK
50.	Practice School	MPG/VJ

Program Committee

Sl. No.	Program committees	Chairperson	Member Secretary
51.	D.Pharm	PKK	BMV
52.	B.Pharm	PKK	DAT
53.	Pharm.D	MR	RSS
54.	M.Pharm	PKK	SNM
55.	B.Pharm – Practice	MR	BRJ
56.	PG Diploma	PKK	JS

M.Pharm Program Coordinators

Sl. No.	M.Pharm Program	Coordinator
57.	Pharmaceutics	VJ
58.	Industrial Pharmacy	ABP
59.	Pharmaceutical Regualatory Affairs	MPV
60.	Pharmaceutical Quality Assurance	HVG

61.	Pharmaceutical Chemistry	BRP
62.	Pharmaceutical Analysis	BMG
63.	Pharmacology	KLK
64.	Pharmacognosy	NPK
65.	Pharmacy Practice	SP

PG Diploma Program Coordinators

Sl. No.	PG Diploma Program	Coordinator
66.	Pharmacovigilance	CSH
67.	Medicine & Poison Information	RSS
68.	Clinical Research	JUS
69.	Nanotechnology	VJ
70.	Pharmaceutical Quality Assurance	HVG
71.	Pharmaceutical Regulatory Affairs	MPV
72.	Medical Devices	BMV
73.	Intellectual Property Rights	BMV
74.	Computer Aided Drug Design	DAT
75.	Food and Drug Analysis	RSC
76.	Regulatory Toxicology	SB
77.	Phytopharmaceutical and Industrial Applications	JS

Certificate Course Coordinators

Sl. No.	Certificate Course	Coordinator
78.	Pharmaceutical Quality Assurance	HVG
79.	Herbal Drug Standardization	JS
80.	Medicine Information	RSS

TEACHING STAFF LIST

Sl. No	NAME	QUALIFICATION	DESIGNATION	Department
1	Dr. T.M. Pramod Kumar (TMP)	M.Pharm., Ph.D.	Professor & Principal	Pharmaceutics
2	Dr. P.K. Kulkarni (PKK)	M.Pharm., Ph.D.	Professor & Vice Principal	Pharmaceutics
3	Dr. D. Vishakante Gowda (DVG)	M.Pharm., Ph.D.	Professor & Head	Pharmaceutics
4	Dr. Balamuralidhara V. (BMV)	M.Pharm., Ph.D.	Asst. Professor	Pharmaceutics
5	Dr. Gangadharappa H.V.(HVG)	M.Pharm., Ph.D.	Asst. Professor	Pharmaceutics
6	Dr. M.P. Venkatesh (MPV)	M.Pharm., Ph.D.	Asst. Professor	Pharmaceutics
7	Dr. Vikas Jain (VJ)	M.Pharm., Ph.D.	Asst. Professor	Pharmaceutics
8	Dr. Amit B Patil (ABP)	M.Pharm., Ph.D.	Asst. Professor	Pharmaceutics
9	Dr. Gowrav M P (MPG)	M.Pharm., Ph.D.	Lecturer	Pharmaceutics
10	Mr. Hemanth Kumar S (HKS)	M.Pharm	Lecturer	Pharmaceutics
11	Mrs. Asha Spandana K M (ASP)	M.Pharm	Lecturer	Pharmaceutics
12	Mr B Mahendran (BM)	M.Pharm	Lecturer	Pharmaceutics
13	Dr Shailesh T (TS)	M.Pharm., Ph.D.	Lecturer	Pharmaceutics
14	Smt Preethi S (PS)	M.Pharm	Lecturer	Pharmaceutics
15	Dr. M. Ramesh (MR)	M.Pharm., Ph.D.	Professor & Head	Pharmacy Practice
16	Mr. D.H. P. Gowda (DHP)	M.Sc., PGDCA.	Asst. Professor	Pharmacy Practice
17	Mrs. Shilpa Palaksha (SP)	M.Pharm.	Asst. Professor	Pharmacy Practice
18	Mrs. Savitha R S (RSS)	M.Pharm.	Asst. Professor	Pharmacy Practice
19	Mr. Jaidev Kumar B R (BRJ)	M.Pharm.	Lecturer	Pharmacy Practice
20	Dr. M Umesh (UM)	Pharm D.	Lecturer	Pharmacy Practice
21	Dr. Juny Sebstian (JUS)	M.Pharm., Ph.D.	Lecturer	Pharmacy Practice
22	Dr Sri Harsha Chalasani (CSH)	M.Pharm., Ph.D.	Lecturer	Pharmacy Practice
23	Dr. Krishna Undela (KU)	M.Pharm., Ph.D.	Lecturer	Pharmacy Practice
24	Dr Srikanth M S (MSS)	M.Pharm., Ph.D.	Lecturer	Pharmacy Practice
25	Mr Balaji S (BS)	M.Pharm	Lecturer	Pharmacy Practice
26	Dr U R Rakshith (URR)	Pharm D	Lecturer	Pharmacy Practice
27	Dr. B.M. Gurupadayya (BMG)	M.Pharm., Ph.D.	Professor	Pharma. Chemistry
28	Dr. Gurubasavaraj V Pujar (GVP)	M.Pharm., Ph.D.	Professor & Head	Pharma. Chemistry
29	Dr. Prashantha Kumar B R (BRP)	M.Pharm., Ph.D.	Asst. Professor	Pharma. Chemistry
30	Dr. R. S. Chandan (RSC)	M.Pharm., Ph.D.	Asst. Professor	Pharma. Chemistry
31	Dr. Anand Kumar Tengli (AKT)	M.Pharm., Ph.D.	Asst. Professor	Pharma. Chemistry
32	Dr. Durai Ananda Kumar (DAT)	M.Pharm., Ph.D.	Asst. Professor	Pharma. Chemistry
33	Dr. Jaishree V (JV)	M.Pharm., Ph.D.	Asst. Professor	Pharma. Chemistry
34	Dr. H. Yogish Kumar (HYK)	M.Pharm., Ph.D.	Lecturer	Pharma. Chemistry
35	Dr. Sheshagiri Dixit (SRD)	M.Pharm., Ph.D.	Lecturer	Pharma. Chemistry

36	Mr. Chetan.I.A	M.Pharm	Lecturer	Pharma. Chemistry
37	Dr. K Mruthunjaya (KM)	M.Pharm., Ph.D.	Professor & Head	Pharmacognosy
38	Dr. J. Suresh (JS)	M.Pharm., Ph.D.	Professor	Pharmacognosy
39	Dr. N Paramakrishnan (NPK)	M.Pharm., Ph.D.	Lecturer	Pharmacognosy
40	Mr. Vageesh Revadigar (VR)	M.Pharm	Lecturer	Pharmacognosy
41	Ms. Haripriya G	M Pharm	Lecturer	Pharmacognosy
42	Dr. S. N. Manjula (SNM)	M.Pharm., Ph.D.	Professor & Head	Pharmacology
43	Dr. Saravana Babu C (SB)	M.Pharm., Ph.D.	Asso.Professor	Pharmacology
44	Dr. K L Krishna (KLK)	M.Pharm., Ph.D.	Asst. Professor	Pharmacology
45	Mrs. A M Mahalakshmi (AMM)	M.Pharm.	Lecturer	Pharmacology
46	Mrs. Seema Mehdi (SM)	M.Pharm	Lecturer	Pharmacology
47	Dr. Nagashree K S (KNS)	M.Pharm., Ph.D	Lecturer	Pharmacology

B.PHARM

Program Educational Objectives (PEOs):

PEO 1: To acquire the theoretical knowledge of pharmaceutical sciences

PEO 2: To acquire practical skills in

- isolation of medicinal compounds from natural sources
- synthesis and analysis of medicinal compounds
- screening medicinal compounds for pharmacological activities
- formulation of pharmaceutical dosage forms and their evaluation

PEO 3: To develop competent Pharmacists with ethical attitude, research intuition, leadership qualities, to participate in public health programs and engage in life-long learning

Program Outcomes (POs):

1. Ability to acquire knowledge of pharmaceutical sciences
2. Ability to design and conduct experiments, to analyze and interpret data
3. Ability to demonstrate effective planning, develop and implement plans within time frame.
4. Ability to function effectively individually and on teams, including diverse and multidisciplinary, to accomplish a task.
5. Ability to understand and appreciate the role of pharmacist in healthcare services.
6. Understanding of professional, ethical, legal, security and social issues and responsibilities.
7. Ability to understand contemporary issues relating to pharmacy profession and challenges ahead.
8. Awareness of ethical and professional responsibilities.
9. Possess the necessary interpersonal and communication skills to be a productive member of the team in work environment.
10. Ability to use current techniques, skills, and modern tools.
11. A strong background and motivation to pursue life-long learning

COURSE HAND OUT 2020-21 Class: B. Pharm - VII Semester

1. Course Details

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP701T	Instrumental Methods of Analysis – Theory	3	1	4
BP702T	Industrial Pharmacy – Theory	3	1	4
BP703T	Pharmacy Practice – Theory	3	1	4
BP704T	Novel Drug Delivery System – Theory	3	1	4
BP705T	Instrumental Methods of Analysis – Practical	4	-	2
BP706T	Practice School*	4	-	2
	Total	**28**	**4**	**24**

2. Evaluation:

a. Internal assessment: Continuous mode

The marks allocated for Continuous mode of Internal Assessment, as per the scheme given below.

Table 1: Scheme for awarding internal assessment: Continuous mode

THEORY		
Criteria	**Maximum Marks**	
Attendance	4	2
Academic activities (Average of any 3 activities e.g. quiz, assignment, open book test, field work, group discussion and seminar)	3	1.5
Student – Teacher interaction	3	1.5
Total	**10**	**5**
PRACTICALS		
Attendance	2	
Based on Practical Records, Regular viva voce, etc.	3	
Total	**5**	

Table 2: Guidelines for the allotment of marks for attendance

Percentage of Attendance	Theory	Practical
95 – 100	4	2
90 – 94	3	1.5
85 – 89	2	1
80 – 84	1	0.5
Less than 80	0	0

b. Sessional Exams

Two Sessional exams shall be conducted for each theory / practical course as per the schedule fixed by the college(s). The scheme of question paper for theory and practical Sessional examinations is given below. The average marks of two Sessional exams shall be computed for internal assessment as per the requirements.

Sessional exam shall be conducted for 30 marks for theory and shall be computed for 15 marks. Similarly Sessional exam for practical shall be conducted for 40 marks and shall be computed for 10 marks.

Question paper pattern for theory Sessional examinations

For subjects having University examination

I. Multiple Choice Questions (MCQs)		
(Answer all the questions)	=	10 x 1 = 10
I. Long Answers (Answer 1 out of 2)	=	1 x 10 = 10
II. Short Answers (Answer 2 out of 3)	=	2 x 5 = 10

Total	=	30 marks

For subjects having Non University Examination

I. Long Answers (Answer 1 out of 2)	=	1 x 10 = 10
II. Short Answers (Answer 4 out of 6)	=	4 x 5 = 20

Total	=	30 marks

Question paper pattern for practical sessional examinations

I. Synopsis	=	10
II. Experiments	=	25
III. Viva voce	=	05

Total	=	40 marks
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3. End semester examinations

The End Semester Examinations for each theory and practical course through semesters I to VIII shall be conducted by the university except for the subjects notified as non-university examinations

Table 3: Scheme for internal assessments and university examination - Semester-VII

Course code	Name of the course	Internal Assessment				University Exam		Total Marks	Credit points
		Continuous Mode	Sessional Exams		Total	Marks	Duration		
			Marks	Duration					
BP701T	Instrumental Methods of Analysis – Theory	10	15	1 Hr	25	75	3 Hrs	100	4
BP702T	Industrial Pharmacy – Theory	10	15	1 Hr	25	75	3 Hrs	100	4
BP703T	Pharmacy Practice – Theory	10	15	1 Hr	25	75	3 Hrs	100	4
BP704T	Novel Drug Delivery System – Theory	10	15	1 Hr	25	75	3 Hrs	100	4
BP705T	Instrumental Methods of Analysis – Practical	5	10	4 Hrs	15	35	4 Hrs	50	2
BP705T	PS Practice School*	25	--	--	25	125	5 Hrs	150	2
Total		**70**	**70**	**8 Hrs**	**140**	**460**	**21 Hrs**	**600**	**20**

4. Promotion and award of grades

A student shall be declared PASS and eligible for getting grade in a course of B.Pharm. programme if he/she secures at least 50% marks in that particular course including internal assessment. For example, to be declared as PASS and to get grade, the student has to secure a minimum of 50 marks for the total of 100 including continuous mode of assessment and end semester theory examination and has to secure a minimum of 25 marks for the total 50 including internal assessment and end semester practical examination.

5. Carry forward of marks

In case a student fails to secure the minimum 50% in any Theory or Practical course as specified (in promotion and award of grades), then he/she shall reappear for the university examination of that course. However his/her marks of the Internal Assessment shall be carried over and he/she shall be entitled for grade obtained by him/her on passing.

6. Improvement of internal assessment

A student shall have the opportunity to improve his/her performance only once in the sessional exam component of the Internal assessment. The re-conduct of the sessional exam should be completed before the commencement of next semester theory examinations.

7. Re-examination of end semester examinations

Reexamination of end semester examination shall be conducted as per the schedule given in table 3. The exact dates of examinations will be notified from time to time.

Table 4: Tentative schedule of university examinations and supplementary examinations

Semester	Regular examinations	Supplementary examinations
I, III, V and VII	November / December	May / June
II, IV, VI and VIII	May / June	November / December

Question pattern for university theory examinations for 75 marks paper

I. Multiple Choice Questions (MCQs)
(Answer all the questions) = 20 x 1 = 20
I. Long Answers (2 out of 3) = 2 x 10 = 20
II. Short Answers (7 out of 9) = 7 x 5 = 35

Total = 75 marks

Question pattern for university theory examinations for 50 marks paper

I. Long Answers (2 out of 3) = 2 x 10 = 20
II. Short Answers (6 out of 8) = 6 x 5 = 30

Total = 50 marks

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8. Grading of performances

Letter grades and grade points allocations

Based on the performances, each student shall be awarded a final letter grade at the end of the semester for each course.

Table 5: Letter grades and grade points equivalent to percentage of marks and performances

Percentage of Marks Obtained	Letter Grade	Grade Point	Performance
90.00 – 100	A+	10	Outstanding
80.00 – 89.99	A	9	Excellent
70.00 – 79.99	B	8	Good
60.00 – 69.99	C	7	Fair
50.00 – 59.99	D	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

A learner who remains absent in any form of evaluation/examination, letter grade allocated to him/her should be assigned a letter grade of AB and a corresponding grade point of zero. He/she should reappear for the said evaluation/examination in due course.

9. Declaration of class

The class shall be awarded on the basis of CGPA as follows:

First Class with Distinction = CGPA of. 7.50 and above
First Class = CGPA of 6.00 to 7.49
Second Class = CGPA of 5.00 to 5.99

10. Attendance: The marks is allotted based on the attendance percentage (Table 2)

11. Chamber consultation hours: Any time during college hours.

12. Tutorial Class: Objective of the tutorial is to enhance the learning ability and help students in better understanding of the subject. This provides a best opportunity for the students to clarify their subject doubts. This involves discussions, presentations on specified topics, assignments and evaluation.

BP701T. INSTRUMENTAL METHODS OF ANALYSIS (Theory)

Teacher/s: Dr. R.S Chandan (RSC) **45 Hours (3 Hrs/ week)**

Scope: This subject deals with the application of instrumental methods in qualitative and quantitative analysis of drugs. This subject is designed to impart a fundamental knowledge on the principles and instrumentation of spectroscopic and chromatographic technique. This also emphasizes on theoretical and practical knowledge on modern analytical instruments that are used for drug testing.

Objectives: Upon completion of the course the student shall be able to

Theory

1. Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis
2. Understand the chromatographic separation and analysis of drugs.
3. Perform quantitative & qualitative analysis of drugs using various analytical instruments

Practical

1. To understand the basic knowledge on instrumentation of various instruments.
2. To perform practical work on real samples to get acquainted with instrumentation.

Course Content

This course covers the design, operational principles and practical application of modern instrumental methods used in chemical analysis. These methods are used in the separation, identification and quantification of the chemical components of natural and synthetic sources.

Chapter No.	Title	No. of Hours
1	**Introduction to chromatography** **Adsorption and partition column chromatography-**Methodology, advantages, disadvantages and applications. **Thin layer chromatography-** Introduction, Principle, Methodology, Rf values, advantages, disadvantages and applications.	5
2	**Paper chromatography-**Introduction, methodology, development techniques, advantages, disadvantages and applications **Electrophoresis**– Introduction, factors affecting electrophoretic mobility, Techniques of paper, gel, capillary electrophoresis, applications	5

3	**Gas chromatography -** Introduction, theory, instrumentation, derivatization, temperature programming, advantages, disadvantages and applications **High performance liquid chromatography (HPLC)-**Introduction, theory, instrumentation, advantages and applications.	**8**
4	**Ion exchange chromatography-** Introduction, classification, ion exchange resins, properties, mechanism of ion exchange process, factors affecting ion exchange, methodology and applications	**4**
5	**Gel chromatography-** Introduction, theory, instrumentation and applications **Affinity chromatography-** Introduction, theory, instrumentation and applications	**3**
6	**UV Visible spectroscopy** Electronic transitions, chromophores, auxochromes, spectral shifts, solvent effect on absorption spectra, Beer and Lambert's law, Derivation and deviations. Instrumentation - Sources of radiation, wavelength selectors, sample cells, detectors-Photo tube, Photomultiplier tube, Photo voltaic cell, Silicon Photodiode. Applications - Spectrophotometric titrations, Single component and multi component analysis	**5**
7	**Fluorimetry** Theory, Concepts of singlet, doublet and triplet electronic states, internal and external conversions, factors affecting fluorescence, quenching, instrumentation and applications	**5**
8	**IR spectroscopy** Introduction, fundamental modes of vibrations in poly atomic molecules, sample handling, factors affecting vibrations Instrumentation - Sources of radiation, wavelength selectors, detectors - Golay cell, Bolometer, Thermocouple, Thermister, Pyroelectric detector and applications	**5**
9	**Flame Photometry-**Principle, interferences, instrumentation and applications **Atomic absorption spectroscopy**- Principle, interferences, instrumentation and applications **Nepheloturbidometry**- Principle, instrumentation and applications	**5**

Theory Sessional examination syllabus

Sessional No.	**Syllabus Chapters no.**
I	1 to 5
II	6 to 9

BP705P. INSTRUMENTAL METHODS OF ANALYSIS (Practical)

Teacher/s: Dr. R.S Chandan (RSC) **4 Hrs/week**

1	Determination of absorption maxima and effect of solvents on absorption maxima of organic compounds
2	Estimation of dextrose by colorimetry
3	Estimation of sulfanilamide by colorimetry
4	Simultaneous estimation of ibuprofen and paracetamol by UV spectroscopy
5	Assay of paracetamol by UV- Spectrophotometry
6	Estimation of quinine sulfate by fluorimetry
7	Study of quenching of fluorescence
8	Determination of sodium by flame photometry
9	Determination of potassium by flame photometry
10	Determination of chlorides and sulphates by nephelo turbidometry
11	Separation of amino acids by paper chromatography
12	Separation of sugars by thin layer chromatography
13	Separation of plant pigments by column chromatography
14	Demonstration experiment on HPLC
15	Demonstration experiment on Gas Chromatography

Recommended Books (Latest Editions)

1. Instrumental Methods of Chemical Analysis by B.K Sharma
2. Organic spectroscopy by Y.R Sharma
3. Text book of Pharmaceutical Analysis by Kenneth A. Connors
4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
5. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake
6. Organic Chemistry by I. L. Finar
7. Organic spectroscopy byWilliam Kemp
8. Quantitative Analysis of Drugs by D. C. Garrett
9. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi
10. Spectrophotometric identification of Organic Compounds by Silverstein

BP 702 T. INDUSTRIAL PHARMACYII (Theory)

Teacher: Dr. M.P. Gowrav (MPG) **45 Hours (3 Hrs/week)**

Scope: This course is designed to impart fundamental knowledge on pharmaceutical product development and translation from laboratory to market

Objectives: Upon completion of the course, the student shall be able to:

Theory:

1. Know the process of pilot plant and scale up of pharmaceutical dosage forms
2. Understand the process of technology transfer from lab scale to commercial batch
3. Know different Laws and Acts that regulate pharmaceutical industry
4. Understand the approval process and regulatory requirements for drug products

Course Content

Chapter No.	Title	No. of Hours
1	**Pilot plant scale up techniques:** General considerations - including significance of personnel requirements, space requirements, raw materials, Pilot plant scale up considerations for solids, liquid orals, semi solids and relevant documentation, SUPAC guidelines, Introduction to platform technology.	10
2	**Technology development and transfer:** WHO guidelines for Technology Transfer(TT): Terminology, Technology transfer protocol, Quality risk management, Transfer from R & D to production (Process, packaging and cleaning), Granularity of TT Process (API, excipients, finished products, packaging materials) Documentation, Premises and equipments, qualification and validation, quality control, analytical method transfer, Approved regulatory bodies and agencies, Commercialization - practical aspects and problems (case studies), TT agencies in India - APCTD, NRDC, TIFAC, BCIL, TBSE / SIDBI; TT related documentation - confidentiality agreement, licensing, MoUs, legal issues.	10

3	**a. Regulatory affairs:** Introduction, Historical overview of Regulatory Affairs, Regulatory authorities, Role of Regulatory affairs department, Responsibility of Regulatory Affairs Professionals. **b. Regulatory requirements for drug approval:** Drug Development Teams, Non-Clinical Drug Development, Pharmacology, Drug Metabolism and Toxicology, General considerations of Investigational New Drug (IND) Application, Investigator's Brochure (IB) and New Drug Application (NDA), Clinical research / BE studies, Clinical Research Protocols, Biostatistics in Pharmaceutical Product Development, Data Presentation for FDA Submissions, Management of Clinical Studies.	**5** **5**
4	**Quality management systems:** Quality management & Certifications: Concept of Quality, Total Quality Management, Quality by Design (QbD), Six Sigma concept, Out of Specifications (OOS), Change control, Introduction to ISO 9000 series of quality systems standards, ISO 14000, NABL, GLP.	**8**
5	**Indian Regulatory Requirements:** Central Drug Standard Control Organization (CDSCO) and State Licensing Authority: Organization, Responsibilities, Certificate of Pharmaceutical Product (COPP), Regulatory requirements and approval procedures for New Drugs.	**7**

Theory Internal assessment syllabus

Internal assessment No.	Syllabus Chapters no.
I	1 – 3a
II	3b – 5

Recommended Books: (Latest Editions)

1. Regulatory Affairs from Wikipedia, the free encyclopedia modified on 7th April available at http,//en.wikipedia.org/wiki/Regulatory_ Affairs.

2. International Regulatory Affairs Updates, 2005. available at http://www.iraup.com/about.php

3. Douglas J Pisano and David S. Mantus. Text book of FDA Regulatory Affairs A Guide for Prescription Drugs, Medical Devices, and Biologics' Second Edition.

4. Regulatory Affairs brought by learning plus, inc. available at http.//www.cgmp.com/ra.htm.

BP 703T. PHARMACY PRACTICE (Theory)

Teacher/s: Dr. Umesh M (UM) **45 Hours (3 Hrs/ week)**

Scope: In the changing scenario of pharmacy practice in India, for successful practice of Hospital Pharmacy, the students are required to learn various skills like drug distribution, drug information, and therapeutic drug monitoring for improved patient care. In community pharmacy, students will be learning various skills such as dispensing of drugs, responding to minor ailments by providing suitable safe medication, patient counselling for improved patient care in the community set up.

Objectives: Upon completion of the course, the student shall be able to

1. Know various drug distribution methods in a hospital
2. Appreciate the pharmacy stores management and inventory control
3. Monitor drug therapy of patient through medication chart review and clinical Review
4. Obtain medication history interview and counsel the patients
5. Identify drug related problems
6. Detect and assess adverse drug reactions
7. Interpret selected laboratory results (as monitoring parameters in therapeutics) of Specific disease states
8. Know pharmaceutical care services
9. Do patient counseling in community pharmacy;
10. Appreciate the concept of rational drug therapy.

Course Content:

The Student understands about the roles and responsibilities of Hospital Pharmacist, Know the drug distribution practices, understand on various methods of drug distribution, have a better understanding on the procedures and methods of drug procurement in the hospital and also to know the importance of inventory control.

Chapter No.	Title	No. of Hours
1	**a) Hospital and it's organization** Definition, Classification of hospital- Primary, Secondary and Tertiary hospitals, Classification based on clinical and non- clinical basis, Organization Structure of a Hospital, and Medical staffs involved in the hospital and their functions.	2
2	**b) Hospital pharmacy and its organization** Definition, functions of hospital pharmacy, Organization structure, Location, Layout and staff requirements, and Responsibilities and functions of hospital pharmacists.	2
3	**c) Adverse drug reaction** Classifications - Excessive pharmacological effects, secondary pharmacological effects, idiosyncrasy, allergic drug reactions, genetically determined toxicity, toxicity following sudden withdrawal of drugs, Drug interaction- beneficial interactions, adverse interactions, and pharmacokinetic drug interactions, Methods for detecting drug interactions, spontaneous case reports and record linkage studies, and Adverse drug reaction reporting and management.	3
4	**d) Community Pharmacy** Organization and structure of retail and wholesale drug store, types and design, Legal requirements for establishment and maintenance of a drug store, Dispensing of proprietary products, maintenance of records of retail and wholesale drug store.	3
5	**a) Drug distribution system in a hospital** Dispensing of drugs to inpatients, types of drug distribution systems, charging policy and labelling, Dispensing of drugs to ambulatory patients, and Dispensing of controlled drugs. **b) Hospital formulary** Definition, contents of hospital formulary, Differentiation of hospital formulary and Drug list, preparation and revision, and addition and deletion of drug from hospital formulary. **c) Therapeutic drug monitoring** Need for Therapeutic Drug Monitoring, Factors to be considered during the Therapeutic Drug Monitoring, and Indian scenario for Therapeutic Drug Monitoring.	2 2 1
6	**d) Medication adherence** Causes of medication non-adherence, pharmacist role in the medication adherence, and monitoring of patient medication adherence. **e) Patient medication history interview** Need for the patient medication history interview, medication interview forms. **f) Community pharmacy management** Financial, materials, staff, and infrastructure requirements.	2 2 1

7	**a) Pharmacy and therapeutic committee** Organization, functions, Policies of the pharmacy and therapeutic committee in including drugs into formulary, inpatient and outpatient prescription, automatic stop order, and emergency drug list preparation. **b) Druginformation services** Drug and Poison information centre, Sources of drug information, Computerised services, and storage and retrieval of information. **c) Patient counseling** Definition of patient counseling; steps involved in patient counseling, and Special cases that require the pharmacist	**2** **2** **1**
8	**d) Education and training program in the hospital** Role of pharmacist in the education and training program, Internal and external training program, Services to the nursing homes/clinics, Code of ethics for community pharmacy, and Role of pharmacist in the interdepartmental communication and community health education. **e) Prescribed medication order and communication skills** Prescribed medication order- interpretation and legal requirements, and Communication skills- communication with prescribers and patients.	**2** **3**
9	**a) Budget preparation and implementation** Budget preparation and implementation **b) Clinical Pharmacy** Introduction to Clinical Pharmacy, Concept of clinical pharmacy, functions and responsibilities of clinical pharmacist, Drug therapy monitoring - medication chart review, clinical review, pharmacist intervention, Ward round participation, Medication history and Pharmaceutical care. Dosing pattern and drug therapy based on Pharmacokinetic & disease pattern. **c) Over the counter (OTC) sales** Introduction and sale of over the counter, and Rational use of common over the counter medications.	**2** **5** **1**
10.	**Drug store management and inventory control** Organization of drug store, types of materials stocked and storage conditions, Purchase and inventory control: principles, purchase procedure, purchase order, procurement and stocking, Economic order quantity, Reorder quantity level, and Methods used for the analysis of the drug expenditure **b) Investigational use of drugs** Description, principles involved, classification, control, identification, role of hospital pharmacist, advisory committee. **c) Interpretation of Clinical Laboratory Tests** Blood chemistry, hematology, and urinalysis	**2** **2** **3**

Theory Internal assessment syllabus

Internal assessment No.	Syllabus Chapters no.
I	1 to 7a
II	7b to 10

Recommended Books (Latest Edition):

1. Merchant S.H. and Dr. J.S.Quadry. *A textbook of hospital pharmacy,* 4th ed. Ahmadabad: B.S. Shah Prakakshan; 2001.
2. Parthasarathi G, Karin Nyfort-Hansen, Milap C Nahata. *A textbook of Clinical Pharmacy Practice- essential concepts and skills,* 1st ed. Chennai: Orient Longman Private Limited; 2004.
3. William E. Hassan. *Hospital pharmacy,* 5th ed. Philadelphia: Lea & Febiger; 1986.
4. Tipnis Bajaj. *Hospital Pharmacy,* 1st ed. Maharashtra: Career Publications; 2008.
5. Scott LT. *Basic skills in interpreting laboratory data,* 4thed. American Society of Health System Pharmacists Inc; 2009.
6. Parmar N.S. *Health Education and Community Pharmacy,* 18th ed. India: CBS Publishers & Distributers; 2008.

Journals:

1. Therapeutic drug monitoring. ISSN: 0163-4356
2. Journal of pharmacy practice. ISSN : 0974-8326
3. American journal of health system pharmacy. ISSN: 1535-2900 (online)
4. Pharmacy times (Monthly magazine)

BP 704T: NOVEL DRUG DELIVERY SYSTEMS (Theory)

Teacher: Dr. Vikas Jain (VJ) **45 Hours (3 Hours/ week)**

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

Objectives: Upon completion of the course student shall be able

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

Course content

This course talks about the recent advancements in drug delivery science based on controlling the release of drug in temporal and spatial manner. The alternate routes of drug delivery have been given a highlight to understand their importance in certain acute and chronic conditions.

Chapter No.	Title	No. of Hours
1	**Controlled drug delivery systems**: Introduction, terminology/definitions and rationale, advantages, disadvantages, selection of drug candidates. Approaches to design controlled release formulations based on diffusion, dissolution and ion exchange principles. Physicochemical and biological properties of drugs relevant to controlled release formulations.	6

2	**Polymers:** Introduction, classification, properties, advantages and application of polymers in formulation of controlled release drug delivery systems.	**4**
3	**Microencapsulation:** Definition, advantages and disadvantages, microspheres /microcapsules, microparticles, methods of microencapsulation, applications	**4**
4	**Mucosal Drug Delivery system:** Introduction, Principles of bioadhesion / mucoadhesion, concepts, advantages and disadvantages, transmucosal permeability and formulation considerations of buccal delivery systems	**4**
5	**Implantable Drug Delivery Systems:**Introduction, advantages and disadvantages, concept of implantsand osmotic pump	**2**
6	**Transdermal Drug Delivery Systems:** Introduction, Permeation through skin, factors affecting permeation, permeation enhancers, basic components of TDDS, formulation approaches	**4**
7	**Gastroretentive drug delivery systems:** Introduction, advantages, disadvantages, approaches for GRDDS – Floating, high density systems, inflatable and gastroadhesive systems and their applications	**4**
8	**Nasopulmonary drug delivery system:** Introduction to Nasal and Pulmonary routes of drug delivery, Formulation of Inhalers (dry powder and metered dose), nasal sprays, nebulizers	**2**
9	**Targeted drug Delivery:** Concepts and approaches advantages and disadvantages,introduction to liposomes, niosomes, nanoparticles, monoclonal antibodies and their Applications	**8**
10	**Ocular Drug Delivery Systems:** Introduction, intra ocular barriers and methods to overcome –Preliminary study, ocular formulations and ocuserts.	**4**
11	**Intrauterine Drug Delivery Systems:** Introduction, advantages and disadvantages, development of intra uterine devices (IUDs) and applications	**3**

Theory Internal assessment syllabus

Internal assessment No.	Syllabus Chapters no.
I	1 - 5
II	6 - 11

Recommended Books: (Latest Editions)

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

Journals

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

JSS Academy of Higher Education & Research
JSS College of Pharmacy, Mysuru

Schedule and Link for Online Classes – B.Pharm

(w.e.f 18-05-2020)

B.Pharm – VII Sem

Day	10:00 AM to 10:50 AM	11:00 AM to 11:50 AM	12:00 PM to 12:50 PM
Mon	Instrumental Methods of Analysis	Industrial Pharmacy II	Pharmacy Practice
Tue	Novel Drug Delivery System	Industrial Pharmacy II	Pharmacy Practice
Wed	Instrumental Methods of Analysis	Novel Drug Delivery System	Pharmacy Practice
Thu	Instrumental Methods of Analysis	Industrial Pharmacy II	Novel Drug Delivery System
Fri	Instrumental Methods of Analysis	Industrial Pharmacy II	Pharmacy Practice
Sat	Novel Drug Delivery System		

JSS Academy of Higher Education & Research

JSS College of Pharmacy

Sri Shivarathreeshwara Nagara, Mysore-570015

MODIFIED CLASSTIME TABLE – 2020-21

Lunch Break: 1.00 to 2.00 PM

Tea Break: 10.40 to 11.10 AM
3.50 PM to 4.05 PM

Class: B. PHARM (Semester- VII)

Time / Day	9.00-9.50AM	9.50-10.40AM	TEA BREAK	11.10-12.05PM	12.05–1.00PM	LUNCH BREAK	2.00-2.55PM	2.55-3.50PM	TEA BREAK	4.05-5.00PM	5.00-5.55PM
Monday	←---------- Instu.Method Analysis --- ←-------- Practice School ---------- ←-------- Practice School ---------- ←-------- Practice School ----------			--Maruthi------Batch-I--------→ -- MPG ------Batch-II---------→ -- JS ------Batch-III---------→ -- AKT-----Batch-IV---------→			←---------- Instu.Method Analysis – ←-------- Practice School ---------- ←-------- Practice School ---------- ←-------- Practice School ----------			----------AKT---Batch-II----------→ -- BRP ------Batch-III----------→ -- ASP------Batch-IV----------→ -- HP-----Batch-I----------→	
Tuesday	←---------- Instu.Method Analysis --- ←-------- Practice School ---------- ←-------- Practice School ---------- ←-------- Practice School ----------			----Maruthi-------Batch-III-------→ -- KM ----------Batch-IV-----→ -- PS--------Batch-I--------→ --HYK ----------Batch-II------→			Drug Delivery System VJ	Industrial Pharmacy -II MPG		Instu, Method Analysis RSC	----------
Wednesday	←----- Instu.Method Analysis-------- ←-------- Practice School ---------- ←-------- Practice School ---------- ←-------- Practice School ----------			----Yuvaraj------Batch-IV-------→ -- NPK---------Batch-II-----→ -- DAK ----------Batch-I-------→ -- ST----------Batch-III------→			Pharmacy Practice **UM**	Instu, Method Analysis **RSC**		Instu, Method Analysis RSC	----------
Thursday	Industrial Pharmacy - II MPG	----------		----------	----------		Industrial Pharmacy - II MPG	Drug Delivery System VJ		Instu, Method Analysis (Tu) RSC	----------
Friday	Pharmacy Practice UM	Drug Delivery System(Tu) VJ		----------	----------		Industrial Pharmacy –II (Tu) MPG	Pharmacy Practice UM		Drug Delivery System VJ	Pharmacy Practice(Tu) UM
Saturday	←-Practice School PP. Department			Namibian Student----------→			←-------- Practice School -- PP. Department -----Namibian Student----------→				

Effective from: 5th Aug 2020

Note: 1. No tea break for practical's

Time table Coordinator **Principal**

Copy: SNB/LNB/SCF/e-copy-Teachers/ Office in charge-Time table / Time table Coordinator