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 – III 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 - III Semester)

Teacher's Incharge

Class	Class Teacher	Batch No.	Batch Teacher
B.Pharm III Semester	Mrs. Preethi S	I	Dr. Jaishree V
		II	Mrs. Asha Spandana
		III	Mr. Vageesh R
		IV	Mrs. Preethi S

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 Cell)	SNM
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 - III Semester

1. Course Details

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP301T	Pharmaceutical Organic Chemistry II – Theory	3	1	4
BP302T	Physical Pharmaceutics I – Theory	3	1	4
BP303T	Pharmaceutical Microbiology – Theory	3	1	4
BP304T	Pharmaceutical Engineering – Theory	3	1	4
BP305P	Pharmaceutical Organic Chemistry II – Practical	4	-	2
BP306P	Physical Pharmaceutics I – Practical	4	-	2
BP307P	Pharmaceutical Microbiology – Practical	4	-	2
BP308P	Pharmaceutical Engineering – Practical	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-III

Course code	Name of the course	Internal Assessment				University Exam		Total Marks	Credit points
		Continuous Mode	Sessional Exams		Total	Marks	Duration		
			Marks	Duration					
BP301T	Pharmaceutical Organic Chemistry II – Theory	10	15	1 Hr	25	75	3 Hrs	100	4
BP302T	Physical Pharmaceutics I – Theory	10	15	1 Hr	25	75	3 Hrs	100	4

BP303T	Pharmaceutical Microbiology – Theory	10	15	1 Hr	25	75	3 Hrs	100	4
BP304T	Pharmaceutical Engineering – Theory	10	15	1 Hr	25	75	3 Hrs	100	4
BP305P	Pharmaceutical Organic Chemistry II – Practical	5	10	4 Hrs	15	35	4 Hrs	50	2
BP306P	Physical Pharmaceutics I – Practical	5	10	4 Hrs	15	35	4 Hrs	50	2
BP307P	Pharmaceutical Microbiology – Practical	5	10	4 Hrs	15	35	4 Hrs	50	2
BP308P	Pharmaceutical Engineering – Practical	5	10	4 Hrs	15	35	4 Hrs	50	2
	Total	**60**	**100**	**20 Hrs.**	**160**	**440**	**28 Hrs.**	**600**	**24**

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

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.

BP301T. PHARMACEUTICAL ORGANIC CHEMISTRY –II (Theory)

Teacher/s: Dr. Jaishree V (JV) **45 Hours (3 Hrs/ week)**

Scope: This subject deals with general methods of preparation and reactions of some organic compounds. Reactivity of organic compounds are also studied here. The syllabus emphasizes on mechanisms and orientation of reactions. Chemistry of fats and oils are also included in the syllabus.

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

Theory:

1. write the structure, name and the type of isomerism of the organic compound
2. write the reaction, name the reaction and orientation of reactions
3. account for reactivity/stability of compounds,
4. prepare organic compounds

Practical:

1. explain the principle involved in the determination of various oil values such as acid value, saponification value and iodine value
2. explain the principle involved in the purification technique by recrystallization and steam distillation
3. perform experiments involving purification techniques and determination of various oil values such as acid value, saponification value and iodine value
4. synthesize and purify selected organic compounds

Course Content:

General methods of preparation and reactions of compounds superscripted with asterisk (*) to be explained

To emphasize on definition, types, classification, principles/mechanisms, applications, examples and differences

Chapter No.	Title	No. of Hours
1	**Benzene and its derivative** Analytical, synthetic and other evidences in the derivation of structure of benzene, Orbital picture, resonance in benzene, aromatic characters, Huckel's rule	2

2	Reactions of benzene - nitration, sulphonation, halogenation- reactivity, Friedel crafts alkylation- reactivity, limitations, Friedel crafts acylation. Substituents, effect of substituents on reactivity and orientation of mono substituted benzene compounds towards electrophilic substitution reaction D) Structure and uses of DDT, Saccharin, BHC and Chloramine	**8**
3	**Phenols*** - Acidity of phenols, effect of substituents on acidity, qualitative tests, Structure and uses of phenol, cresols, resorcinol, naphthols	**4**
4	**Aromatic Acids* –**Acidity, effect of substituents on acidity and important reactions of benzoic acid. **Aromatic Amines* -** Basicity of amines, effect of substituents on basicity, and synthetic uses of aryl diazonium salts	**6**
5	**Fats and Oils** A) Fatty acids – reactions. B) Hydrolysis, Hydrogenation, Saponification and Rancidity of oils, Drying oils.	**5**
6	Analytical constants – Acid value, Saponification value, Ester value, Iodine value, Acetyl value, Reichert Meissl (RM) value – significance and principle involved in their determination	**5**
7	**Polynuclear hydrocarbons:** a. Synthesis, reactions b. Structure and medicinal uses of Naphthalene, Phenanthrene, Anthracene, Diphenylmethane, Triphenylmethane and their derivatives	**8**
8	**Cyclo alkanes*** Stabilities – Baeyer's strain theory, limitation of Baeyer's strain theory, Coulson and Moffitt's modification, Sachse Mohr's theory (Theory of strainless rings), reactions of cyclopropane and cyclobutane only)	**7**

Theory Sessional examination syllabus

Sessional No.	**Syllabus**
	Chapters no.
I	1 to 4
II	5 to 8

BP306P. PHARMACEUTICAL ORGANIC CHEMISTRY -II (Practical)

Teacher/s: Dr. Jaishree V (JV) **4 Hrs/week**

I	Experiments involving laboratory techniques Recrystallization Steam distillation
II	Determination of following oil values (including standardization of reagents) Acid value Saponification value Iodine value
III	**Preparation of compounds** 1. Benzanilide/Phenyl benzoate/Acetanilide from Aniline/ Phenol /Aniline by acylation reaction. 2. 2,4,6-Tribromo aniline/Para bromo acetanilide from Aniline/ 3. Acetanilide by halogenation (Bromination) reaction. 4. 5-Nitro salicylic acid/Meta di nitro benzene from Salicylic acid / Nitro benzene by nitration reaction. 5. Benzoic acid from Benzyl chloride by oxidation reaction. 6. Benzoic acid/ Salicylic acid from alkyl benzoate/ alkyl salicylate by hydrolysis reaction. 7. 1-Phenyl azo-2-napthol from Aniline by diazotization and coupling reactions. 8. Benzil from Benzoin by oxidation reaction. 9. Dibenzal acetone from Benzaldehyde by Claison Schmidt reaction 10. Cinnammic acid from Benzaldehyde by Perkin reaction 11. *P*-Iodo benzoic acid from *P*-amino benzoic acid

Recommended Books (Latest Editions)

1. Organic Chemistry by Morrison and Boyd
2. Organic Chemistry by I.L. Finar , Volume-I
3. Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
4. Organic Chemistry by P.L.Soni
5. Practical Organic Chemistry by Mann and Saunders.
6. Vogel's text book of Practical Organic Chemistry
7. Advanced Practical organic chemistry by N.K.Vishnoi.
8. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.

BP302 T. PHYSICAL PHARMACEUTICS-I (Theory)

Teacher: Dr. H.V. Gangadharappa (HVG) **45 Hours (3 Hrs/week)**

Scope: The course deals with the various physical, physicochemical properties and principle involved in dosage forms, formulations. Theory and practical components of the subject help the student to get a better insight in to various areas of formulation research and development and stability studies of pharmaceutical dosage forms.

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

Theory:

1. Understand various physicochemical properties of drug molecules in the designing the dosage forms
2. Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

Practical:

1. perform and determine the solubility, partition coefficient and pKa of drugs in the development of dosage form.
2. determine the adsorption of drugs and surface area by adsorption method
3. evaluate the stability constant of drugs with complexing agent and its influence in the development of dosage form.

Lecture wise Programme:

Chapter No.	Title	No. of Hours
1	**Solubility of drugs:** Solubility expressions, mechanisms of solute solvent interactions, ideal solubility parameters, solvation & association, quantitative approach to the factors influencing solubility of drugs, diffusion principles in biological systems. Solubility of gas in liquids, solubility of liquids in liquids, (Binary solutions, ideal solutions) Raoult's law, real solutions. Partially miscible liquids, Critical solution temperature and applications. Distribution law, its limitations and applications	**10**

2	**States of Matter and properties of matter:** State of matter, changes in the state of matter, latent heats, vapour pressure, sublimation critical point, eutectic mixtures, gases, aerosols – inhalers, relative humidity, liquid complexes, liquid crystals, glassy states, solid-crystalline, amorphous & polymorphism. **Physicochemical properties of drug molecules:** Refractive index, optical rotation, dielectric constant, dipole moment, dissociation constant, determinations and applications	**10**
3	**a) Surface and interfacial phenomenon:** Liquid interface, surface & interfacial tensions, surface free energy, measurement of surface & interfacial tensions, **b)** Spreading coefficient, adsorption at liquid interfaces, surface active agents, HLB Scale, solubilisation, detergency, adsorption at solid interface.	**3** **7**
4	**Complexation and protein binding**: Introduction, Classification of Complexation, Applications, methods of analysis, protein binding, Complexation and drug action, crystalline structures of complexes and thermodynamic treatment of stability constants.	**8**
5	**pH, buffers and Isotonic solutions:** Sorensen's pH scale, pH determination (electrometric and calorimetric), applications of buffers, buffer equation, buffer capacity, buffers in pharmaceutical and biological systems, buffered isotonic solutions.	**7**

Theory Internal assessment syllabus

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

BP 307 P. PHYSICAL PHARMACEUTICS – I (Practical)

Teacher/s: Dr. H.V. Gangadharappa (HVG) & Mrs. Akhila (PhD)

4 Hrs/week

1. Determination the solubility of drug at room temperature
2. Determination of pKa value by Half Neutralization/ Henderson Hasselbalch equation.
3. Determination of Partition co- efficient of benzoic acid in benzene and water
4. Determination of Partition co- efficient of Iodine in CCl_4 and water
5. Determination of % composition of NaCl in a solution using phenol-water system by CST method
6. Determination of surface tension of given liquids by drop count and drop weight method
7. Determination of HLB number of a surfactant by saponification method
8. Determination of Freundlich and Langmuir constants using activated char coal
9. Determination of critical micellar concentration of surfactants
10. Determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method
11. Determination of stability constant and donor acceptor ratio of Cupric-Glycine complex by pH titration method

Recommended Books: (Latest Editions)

1. Physical Pharmacy by Alfred Martin
2. Experimental Pharmaceutics by Eugene, Parott.
3. Tutorial Pharmacy by Cooper and Gunn.
4. Stocklosam J. Pharmaceutical Calculations, Lea &Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, Marcel Dekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
7. Physical Pharmaceutics by Ramasamy C and Manavalan R.
8. Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanyam, J. Thimma settee
9. Physical Pharmaceutics by C.V.S. Subramanyam
10. Test book of Physical Phramacy, by Gaurav Jain & Roop K. Khar

BP 303 T. PHARMACEUTICAL MICROBIOLOGY (Theory)

Teacher/s: Mr Vageesh Revadigar (VR) **45 Hours (3 Hrs/ week)**

Scope:

Study of all categories of microorganisms especially for the production of alcohol antibiotics, vaccines, vitamins enzymes etc..

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

Theory:

1. Understand methods of identification, cultivation and preservation of various microorganisms
2. To understand the importance and implementation of sterilization in pharmaceutical processing and industry
3. Learn sterility testing of pharmaceutical products.
4. Carried out microbiological standardization of Pharmaceuticals.
5. Understand the cell culture technology and its applications in pharmaceutical industries.

Practical:

1. write the (remember) the sources of microbial contamination and problems associated with it
2. explain the methods of identification, cultivation, counting and preservation of microorganisms
3. enlist the methods of sterilization and know their merits and demerits
4. suggest the method of sterilization for different pharmaceutical products.

5. classify various disinfectants, write their methods of testing the efficacy and their applications
6. explain sterility testing of pharmaceutical products.
7. write the methods involved in cell culture technology and its applications in pharmaceutical industries.

Course content:

Chapter No.	Topic	No. of Hours
1	Introduction to Microbiology	
	a) Introduction, history of microbiology, its branches, scope and its importance.	3
	b) Introduction to Prokaryotes and Eukaryotes	2
	c) Study of ultra-structure and morphological classification of bacteria, nutritional requirements, raw materials used for culture media and physical parameters for growth, growth curve, isolation and preservation methods for pure cultures, cultivation of anaerobes, quantitative measurement of bacterial growth (total & viable count).	3
	d) Study of different types of phase microscopy, dark field microscopy and electron microscopy.	2
2	a) Identification of bacteria using staining techniques (simple, Gram's & Acid fast staining) and biochemical tests (IMViC).	2
	b) Study of principle, procedure, merits, demerits and applications of Physical, chemical, gaseous, radiation and mechanical method of sterilization.	3
	c) Evaluation of the efficiency of sterilization methods.	2
	d) Equipments employed in large scale sterilization.	1
	e) Sterility indicators.	2
3	a) Study of morphology, classification, reproduction/replication and cultivation of Fungi and Viruses.	3
	b) Classification and mode of action of disinfectants	1
	c) Factors influencing disinfection, antiseptics and their evaluation for bacteriostatic and bactericidal actions	2
	d) Evaluation of bactericidal & Bacteriostatic.	1
	e) Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP.	3
4	a) Designing of aseptic area, laminar flow equipment; study of different sources of contamination in an aseptic area and methods of prevention, clean area classification.	3

	b) Principles and methods of different microbiological assay. Methods for standardization of antibiotics, vitamins and amino acids. c) Assessment of a new antibiotic.	3 2
5	a) Types of spoilage, factors affecting the microbial spoilage of pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage. b) Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations. c) Growth of animal cells in culture, general procedure for cell culture, Primary, established and transformed cell cultures. d) Application of cell cultures in pharmaceutical industry and research.	2 2 2 1

Theory Internal assessment syllabus

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

BP307P. MICROBIOLOGY (Practical)

Teacher/s: Dr. Vageesh R (VR) **4 Hrs/week**

1. Introduction and study of different equipments and processing, e.g., B.O.D. incubator, laminar flow, aseptic hood, autoclave, hot air sterilizer, deep freezer, refrigerator, microscopes used in experimental microbiology.
2. Sterilization of glassware, preparation and sterilization of media.
3. Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations.
4. Staining methods- Simple, Grams staining and acid fast staining (Demonstration with practical).
5. Isolation of pure culture of micro-organisms by multiple streak plate technique and other techniques.
6. Microbiological assay of antibiotics by cup plate method and other methods
7. Motility determination by Hanging drop method.
8. Sterility testing of pharmaceuticals.
9. Bacteriological analysis of water
10. Biochemical test.

References

1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
2. Prescott and Dunn., Industrial Microbiology, 4th edition, CBS Publishers & Distributors, Delhi.
3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
4. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
5. Rose: Industrial Microbiology.
6. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan
7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
8. Peppler: Microbial Technology.
9. I.P., B.P., U.S.P- latest editions.
10. Ananthnarayan: Text Book of Microbiology, Orient-Longman, Chennai
11. Edward: Fundamentals of Microbiology.
12. N.K.Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi
13. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company

BP 304 T. PHARMACEUTICAL ENGINEERING (Theory)

Teacher: Mrs. Preeethi S (PS) **45 Hours (3 Hours/ week)**

Scope: This course is designed to impart a fundamental knowledge on the art and science of various unit operations used in pharmaceutical industry.

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

Theory:

1. To know various unit operations used in Pharmaceutical industries.
2. To understand the material handling techniques.
3. To perform various processes involved in pharmaceutical manufacturing process.
4. To carry out various test to prevent environmental pollution.
5. To appreciate and comprehend significance of plant lay out design for optimum use of resources.

6. To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.

Practicals:

1. To know various unit operations used in Pharmaceutical industries.
2. To Demonstration of manufacturing equipment involved in manufacturing process.
3. To perform various processes involved in pharmaceutical manufacturing like Filtration,
4. Evaporation, Crystallization, Mixing , Drying etc.
5. To carry out determination of radiation constant for various materials used in pharmaceutical industry.
6. To calculate the efficiency of Distillation.
7. To Determine Humidity of air and moisture content.

Course content

Chapter No.	Topics	No. of Hours
1	**Flow of fluids:** Types of manometers, Reynolds number and its significance, Bernoulli's theorem and its applications, Energy losses, Orifice meter, Venturimeter, Pitot tube and Rotometer	**03**
2	**Size Reduction:** Objectives, Mechanisms & Laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of Hammer mill, ball mill, fluid energy mill, Edge runner mill & end runner mill.	**03**
3	**Size Separation:** Objectives, applications & mechanism of size separation, official standards of powders, sieves, size separation Principles, construction, working, uses, merits and demerits of Sieve shaker, cyclone separator, Air separator, Bag filter & elutriation tank.	**04**
4	**Mixing:** Objectives, applications & factors affecting mixing, Difference between solid and liquid mixing, mechanism of solid mixing, liquids mixing and semisolids mixing. Principles, Construction, Working, uses, Merits and Demerits of Double cone blender, twin shell blender, ribbon blender, Sigma blade mixer, planetary mixers, Propellers, Turbines, Paddles & Silverson Emulsifier,	**05**
5	**Evaporation:** Objectives, applications and factors influencing evaporation, differences between evaporation and other heat process. principles, construction, working, uses, merits and demerits of Steam jacketed kettle, horizontal tube evaporator, climbing film evaporator, forced circulation evaporator, multiple effect evaporator & Economy of	**04**

	multiple effect evaporator.	
6	**Heat Transfer:** Objectives, applications & Heat transfer mechanisms. Fourier's law, Heat transfer by conduction, convection & radiation. Heat interchangers & heat exchangers.	**03**
7	**Drying:** Objectives, applications & mechanism of drying process, measurements & applications of Equilibrium Moisture content, rate of drying curve. principles, construction, working, uses, merits and demerits of Tray dryer, drum dryer spray dryer, fluidized bed dryer, vacuum dryer, freeze dryer.	**05**
8	**Distillation:** Basic Principles and methodology of simple distillation, flash distillation, fractional distillation, distillation under reduced pressure, steam distillation & molecular distillation	**05**
9	**Filtration:** Objectives, applications, Theories & Factors influencing filtration, filter aids, filter medias. Principle, Construction, Working, Uses, Merits and demerits of plate & frame filter, filter leaf, rotary drum filter, Meta filter & Cartridge filter, membrane filters and Seidtz filter.	**05**
10	**Centrifugation:** Objectives, principle & applications of Centrifugation, principles, construction, working, uses, merits and demerits of Perforated basket centrifuge, Non-perforated basket centrifuge, semi continuous centrifuge & super centrifuge.	**05**
11	**Materials of pharmaceutical plant construction, Corrosion and its prevention:** Factors affecting during materials selected for Pharmaceutical plant construction, Theories of corrosion, types of corrosion and there prevention. Ferrous and nonferrous metals, inorganic and organic non metals, basic of material handling systems.	**03**

Theory Internal assessment syllabus

Internal assessment No.	**Syllabus Chapters no.**
I	1 – 6
II	7 – 11

Recommended Books: (Latest Editions)

1. Introduction to chemical engineering – Walter L Badger & Julius Banchero, Latest edition.
2. Solid phase extraction, Principles, techniques and applications by Nigel J.K. Simpson- Latest edition.

3. Unit operation of chemical engineering – Mcabe Smith, Latest edition.
4. Pharmaceutical engineering principles and practices – C.V.S Subrahmanyam et al., Latest
1. edition.
5. Remington practice of pharmacy- Martin, Latest edition.
6. Theory and practice of industrial pharmacy by Lachmann., Latest edition.
7. Physical pharmaceutics- C.V.S Subrahmanyam et al., Latest edition.
8. Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition.

BP 308 P. PHARMACEUTICAL ENGINEERING (Practical)

Teacher: Mrs. Preeethi S (PS) **45 Hours**

I. Determination of radiation constant of brass, iron, unpainted and painted glass.
II. Steam distillation – To calculate the efficiency of steam distillation.
III. To determine the overall heat transfer coefficient by heat exchanger.
IV. Construction of drying curves (for calcium carbonate and starch).
V. Determination of moisture content and loss on drying.
VI. Determination of humidity of air – i) From wet and dry bulb temperatures –use of Dew point method.
VII. Description of Construction working and application of Pharmaceutical Machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, de humidifier.
VIII. Size analysis by sieving – To evaluate size distribution of tablet granulation Construction of various size frequency curves including arithmetic and logarithmic probability plots.
IX. Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger's, Bond's coefficients, power requirement and critical speed of Ball Mill.
X. Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such other major equipment.
XI. Factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/ viscosity
XII. To study the effect of time on the Rate of Crystallization.
XIII. To calculate the uniformity Index for given sample by using Double Cone Blender.

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 – III Sem

Day	10:00 AM to 10:50 AM	11:00 AM to 11:50 AM	12:00 PM to 12:50 PM
Mon	Pharmaceutical Organic Chemistry II	Physical Pharmaceutics I	Pharmaceutical Microbiology
Tue	Pharmaceutical Engineering	Physical Pharmaceutics I	Pharmaceutical Microbiology
Wed	Pharmaceutical Organic Chemistry II	Pharmaceutical Engineering	Pharmaceutical Microbiology
Thu	Pharmaceutical Organic Chemistry II	Physical Pharmaceutics I	Pharmaceutical Engineering
Fri	Pharmaceutical Organic Chemistry II	Physical Pharmaceutics I	Pharmaceutical Microbiology
Sat	Pharmaceutical Engineering		

JSS Academy of Higher Education & Research

JSS College of Pharmacy

Sri Shivarathreeshwara Nagara, Mysore-570015

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- III)

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	←--- Physical Pharmaceutics -------- ←----Pharm.Organic Chemistry-II -- ←-----Pharm.Engineering ----------			-------Batch – I---------HVG-------→ ------Batch – III-----HYK---------→ ------Batch – IV-----PS----------→			Pharmaceutical Microbiology VR	Pharmaceutical Engineering PS		Pharmaceutical Microbiology(Tu) VR	---------
Tuesday	←---------- Microbiology----------			------Batch – II--------VR----------→			Physical Pharmaceutics HVG	Pharmaceutical Engineering PS		Physical Pharmaceutics (Tu) HVG	---------
Wednesday		----------		----------	Pharmaceutical Engineering PS		Pharm.Organic Chemistry II JV	Physical Pharmaceutics **HVG**		Pharm.Organic Chemistry II JV	---------
Thursday	←--- Physical Pharmaceutics -------- ←---------- Microbiology---------- ←----Pharm.Organic Chemistry-II -- ←-----Pharm.Engineering ----------			-------Batch –II---------HVG ------→ ------Batch – III-------VR---------→ ---------Batch – IV-----JV----→ ----------Batch – I-----PS-----→			Pharm.Organic Chemistry II JV	Physical Pharmaceutics HVG		Microbiology VR	---------
Friday	←--- Physical Pharmaceutics -------- ←---------- Microbiology---------- ←----Pharm.Organic Chemistry-II -- ←-----Pharm.Engineering ----------			-------Batch – III-------HVG-------→ ------Batch – IV--------VR--------→ ---------Batch – I-----HYK----→ ----------Batch – II-----PS-----→			Microbiology (Tutorial) VR	Pharm.Organic Chemistry II(Tu) JV		Pharmaceutical Engineering (Tu) PS	---------
Saturday	←--- Physical Pharmaceutics -------- ←---------- Microbiology---------- ←----Pharm.Organic Chemistry-II -- ←-----Pharm.Engineering ----------			-------Batch – IV-------Ak-------→ ------Batch – I--------VR-------→ ---------Batch – II-----JV----→ ----------Batch – III-----PS-----→							

***Effective from: 24th June 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