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

B. Pharm – VIII Semester
Course Handout
2021-22

Ranked 1st among the YOUNG UNIVERSITIES in Karnataka

JSS College of Pharmacy, Mysuru – 9th Rank in INDIA 2021

INTERNATIONAL CERTIFICATION
Pharm D Program is Certified by Accreditation Council for Pharmacy Education (ACPE), USA

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 9001:2008 Certified Institution

Accredited 'A+' Grade by NAAC

VISION

To be a leader in pharmaceutical sciences & pharmacy practice education, training, research and continuous professional development for pharmacists and Pharmaceutical Scientists providing competent patient care and nurturing drug discovery and development.

MISSION

- To impart knowledge, develop skills and competencies in students in pharmaceutical sciences and pharmacy practice.
- To Develop and advance the knowledge, attitude and skills of pharmacists and faculty members who can provide comprehensive pharmaceutical care to patients, improve patient outcomes, and meet societal needs for safe and effective drug therapy.
- To develop, promote and nurture research activities in pharmaceutical sciences and pharmacy practice and translating research into healthcare

CORE VALUES

- Innovation, Leadership, Excellence, Integrity, Respect, Professionalism

STRATEGIC PLAN 2020-2025

- JSS Academy of higher Education & Research, College of Pharmacy, will position themselves as the **SMART** Colleges of Pharmacy In the Country by 2025 by developing and advancing

S	Student Quality
M	Motivation
A	Academic Excellence
R	Research & Innovation
T	Technology

Academic Calendar 2021-22
(B. Pharm – VIII Semester)

1. **Commencement of Classes**

   B. Pharm – VIII Semester - 23rd February, 2022

2. **Sessional Examination Schedule**

I	II
Theory - 5th week of April 2022	Theory - 4th week of June 2022
Practical - 4th week of April 2022	Practical – 3rd week of June 2022

3. **Closure of Term** - 1st week of July 2022(Tentative dates)
4. **End semester Examination** - 2nd week of July 2022 (Tentative dates)

Teacher's In charge

Class	Class Teacher	Batch No.	Batch Teacher
IV B. Pharm VIII Semester	Dr. Gowrav M P	I	Dr. Gowrav M P
		II	Mr. B. Mahendran
		III	Dr. Umesh M
		IV	Dr. R.S Chandan

ACTIVITIES AND COORDINATORS 2021-22

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	MR
5.	Industrial Visits, Training and placements	TS/ABP
6.	Guest lecture & Seminar/ conference/ training / workshop/Webinar • organized at college • delivered/attended by staff	Respective department all HODs/Program coordinators/organizing secretary
7.	Internal Assessment Committee Chairperson Members	GVP RSS/AKT/DAK/BMV
8.	• Academic Council Board • Identification of Advanced/ Medium/ Slow learners	Class Teachers Subject Teachers
9.	Ethics committee Meeting • Animal	KLK

	• Human	MR
10.	Time table	DHP TS/ URR/ DT/HYK
11.	Internal Quality Assurance Cell Chairperson Members	TMP/HVG / AMM/AKT/RSC/SP/JS
12.	Women's cell (Prevention of Sexual Harassment Cell)	SNM
13.	Scholarship Bureau	RSC/program coordinators/Class teachers
14.	Compilation of publications (Research papers/books/chapters)	BMG
15.	Research Coordination Committee -Compilation of Ph.D details and funded projects - Review of publications	Chairperson – DVG Members – SB/ BRP/JS/JUS
16.	APC (Plagiarism)	Chairperson –TMP Member Secretary-BRP Member-HVG
17.	Pharmacy Education Unit (CCLPE)	MSS/AS
18.	Annual result analysis List of merit students	UG – Subject Teacher, Class teacher & Program committee PG – Course Coordinator & Abhishek (Office)
19.	GPAT and other competitive exams (TOEFL, GRE etc.)	BM/ CSH/MPG/ Class teacher
20.	Library orientation	Librarian
21.	Soft Skills Training	ABP/CIA

Extracurricular activities

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

Other Institutional activities

Sl. No.	Activities	Coordinator/s
28.	Annual Day celebration / Graduation day	DAT/SM
29.	Course handouts/ Teachers diary/	HYK/PS

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

Program Committee

Sl. No.	Program committees	Chairperson	Member Secretary
52.	D.Pharm	BMV	URR
53.	B.Pharm	GVP	DAT
54.	Pharm.D	MR	RSS
55.	M.Pharm	SNM	AKT
56.	B.Pharm – Practice	MR	BS
57.	PG Diploma	JS	BM

M.Pharm Program Coordinators

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

62.	Pharmaceutical Chemistry	BRP
63.	Pharmaceutical Analysis	AKT
64.	Pharmacology	KLK
65.	Pharmacognosy	NPK
66.	Pharmacy Practice	SP
67.	Pharmaceutical Biotechnology	JS

PG Diploma Program Coordinators

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

Certificate Course Coordinators

Sl. No.	Certificate Course	Coordinator
80.	Pharmaceutical Quality Assurance	HKS
81.	Herbal Drug Standardization	JS
82.	Medicine Information	RSS
83.	Clinical Research	JUS
84.	Global Regulatory Affairs	MPV

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. D. Vishakante Gowda (DVG)	M.Pharm., Ph.D.	Professor & Head	Pharmaceutics
3.	Dr. Balamuralidhara V. (BMV)	M.Pharm., Ph.D.	Assoc. Professor	Pharmaceutics
4.	Dr. Gangadharappa H.V. (HVG)	M.Pharm., Ph.D.	Assoc. Professor	Pharmaceutics
5.	Dr. M.P. Venkatesh (MPV)	M.Pharm., Ph.D.	Assoc. Professor	Pharmaceutics

6.	Dr. Vikas Jain (VJ)	M.Pharm., Ph.D.	Assoc. Professor	Pharmaceutics
7.	Dr. Amit B Patil (ABP)	M.Pharm., Ph.D.	Assoc. Professor	Pharmaceutics
8.	Dr. Gowrav M P (MPG)	M.Pharm., Ph.D.	Asst. Professor	Pharmaceutics
9.	Mr. Hemanth Kumar S (HKS)	M.Pharm	Asst. Professor	Pharmaceutics
10.	Dr. Riyaz Ali Osmani (RAO)	M.Pharm., Post. Doc.	Asst. Professor	Pharmaceutics
11.	Ms. 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.	Ms. Preethi S (PS)	M.Pharm	Lecturer	Pharmaceutics
15.	Dr. M. Ramesh (MR)	M.Pharm., Ph.D.	Professor & Head	Pharmacy Practice
16.	Ms. Shilpa Palaksha (SP)	M.Pharm.	Assoc. Professor	Pharmacy Practice
17.	Dr. Savitha R S (RSS)	M.Pharm.	Assoc. Professor	Pharmacy Practice
18.	Mr. D.H. P. Gowda (DHP)	M.Sc., PGDCA.	Asst. Professor	Pharmacy Practice
19.	Dr. M Umesh (UM)	Pharm D.	Asst. Professor	Pharmacy Practice
20.	Dr. Juny Sebstian (JUS)	M.Pharm., Ph.D.	Asst. Professor	Pharmacy Practice
21.	Dr. Sri Harsha Chalasani (CSH)	M.Pharm., Ph.D.	Asst. Professor	Pharmacy Practice
22.	Dr. Jaidev Kumar B R (BRJ)	M.Pharm.	Lecturer	Pharmacy Practice
23.	Dr. Srikanth M S (MSS)	M.Pharm., Ph.D.	Lecturer	Pharmacy Practice
24.	Mr Balaji S (BS)	M.Pharm	Lecturer	Pharmacy Practice
25.	Dr. U R Rakshith (URR)	Pharm D	Lecturer	Pharmacy Practice
26.	Dr. Acsah Annie Paul (AAP)	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. R. S. Chandan (RSC)	M.Pharm., Ph.D.	Assoc. Professor	Pharma. Chemistry
30.	Dr. Prashantha Kumar B R (BRP)	M.Pharm., Ph.D.	Assoc. Professor	Pharma. Chemistry
31.	Dr. Anand Kumar Tengli (AKT)	M.Pharm., Ph.D.	Assoc. Professor	Pharma. Chemistry
32.	Dr. Durai Ananda Kumar (DAT)	M.Pharm., Ph.D.	Asst. Professor	Pharma. Chemistry
33.	Dr. H. Yogish Kumar (HYK)	M.Pharm., Ph.D.	Lecturer	Pharma. Chemistry
34.	Dr. Sheshagiri Dixit (SRD)	M.Pharm., Ph.D.	Lecturer	Pharma. Chemistry
35.	Mr. Chetan.I.A (CIA)	M.Pharm	Lecturer	Pharma. Chemistry
36.	Dr. K Mruthunjaya (KM)	M.Pharm., Ph.D.	Professor & Head	Pharmacognosy
37.	Dr. J. Suresh (JS)	M.Pharm., Ph.D.	Professor	Pharmacognosy
38.	Dr. N Paramakrishnan (NPK)	M.Pharm., Ph.D.	Asst. Professor	Pharmacognosy
39.	Mr. Rajaguru A (RG)	M.Pharm.	Lecturer	Pharmaceutical Biotechnology
40.	Ms. Haripriya G (HG)	M Pharm	Lecturer	Pharmacognosy
41.	Dr. S. N. Manjula (SNM)	M.Pharm., Ph.D.	Professor & Head	Pharmacology
42.	Dr. Saravana Babu C (SB)	M.Pharm., Ph.D.	Professor	Pharmacology
43.	Dr. K L Krishna (KLK)	M.Pharm., Ph.D.	Assoc. Professor	Pharmacology
44.	Ms. A M Mahalakshmi (AMM)	M.Pharm.	Asst. Professor	Pharmacology
45.	Ms. Seema Mehdi (SM)	M.Pharm	Lecturer	Pharmacology

46.	Dr. Nagashree K S (KNS)	M.Pharm ., Ph.D	Lecturer	Pharmacology
47.	Dr. Dithu Thekkekkara (DT)	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 Code	Name of the course	No. of hours	Tutorial	Credit points
BP801T.	Biostatisitcs And Research Methodology (Theory)	3	1	4
BP802T	Social And Preventive Pharmacy	3	1	4
BP803ET	Pharma Marketing Management (Theory)	3+3=6	1+1=2	4+4=8
BP604T	Pharmaceutical Regulatory Science – Theory			
BP605T	Pharmacovigilance – Theory			
BP806ET	Quality Control and Standardization of Herbals – Theory			
BP807ET	Computer Aided Drug Design –			
BP808ET	Cell and Molecular Biology – Theory			
BP809ET	Cosmetic Science – Theory			
BP810ET	Experimental Pharmacology – Theory			
BP811ET	Advanced Instrumentation Techniques – Theory			
BP812ET	Project Work	12	-	6
	Total	**24**	**4**	**22**

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

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-VIII

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Course code	
			Marks	Duration				
BP801T.	Biostatistics and Research Methodology (Theory)	10	15	1Hrs	25	75	3Hrs	100
BP 802T	Social And Preventive Pharmacy	10	15	1Hrs	25	75	3Hrs	100
BP803ET	Pharma Marketing Management (Theory)							
BP804 ET:	Pharmaceutical Regulatory Science - theory							

BP 805ET	Pharmacovigilance (Theory)	10+10 =20	15+15 =30	1+1+2Hrs	25+2 5=50	75+75 =150	3+3=6Hrs	100+100 =200
BP 806 ET	Quality Control And Standardization Of Herbals							
BP807ET	Computer aided drug design							
BP808ET	Cell and molecular biology -theory							
BP809ET	Computer science - theory							
BP810ET	Experimental pharmacology - theory							
BP811ET	Advanced instrumentation techniques-Theory							
BP812W	Project work					150	4Hrs	150
Total		**40**	**60**	**4Hrs**	**100**	**450**	**16Hrs**	**550**

* The lateral entry students must undertake non-university Examination for Communication skills and computer applications in pharmacy subjects

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.

13. Project work

All the students shall undertake a project under the supervision of a teacher and submit a report. The area of the project shall directly relate any one of the elective subject opted by the student in semester VIII. The project shall be carried out in group not exceeding 5 in number. The project report shall be submitted in triplicate (typed & bound copy not less than 25 pages).

The internal and external examiner appointed by the University shall evaluate the project at the time of the Practical examinations of other semester(s). Students shall be evaluated in groups for four hours (i.e., about half an hour for a group of five students). The projects shall be evaluated as per the criteria given below.

Evaluation of Dissertation Book:

Objective(s) of the work done	15 Marks
Methodology adopted	20 Marks
Results and Discussions	20 Marks
Conclusions and Outcomes	20 Marks
Total	**75 Marks**

Evaluation of Presentation:

Presentation of work	25 Marks
Communication skills	20 Marks
Question and answer skills	30 Marks
Total	**75 Marks**

Explanation: The 75 marks assigned to the dissertation book shall be same for all the students in a group. However, the 75 marks assigned for presentation shall be awarded based on the performance of individual students in the given criteria.

15. Industrial training (Desirable)

Every candidate shall be required to work for at least 150 hours spread over four weeks in a Pharmaceutical Industry/Hospital. It includes Production unit, Quality Control department, Quality Assurance department, Analytical laboratory, Chemical manufacturing unit, Pharmaceutical R&D, Hospital (Clinical Pharmacy), Clinical Research Organization, Community Pharmacy, etc. After the Semester – VI and before the commencement of Semester – VII, and shall submit satisfactory report of such work and certificate duly signed by the authority of training organization to the head of the institute.

16. Practice School

In the VII semester, every candidate shall undergo practice school for a period of 150 hours evenly distributed throughout the semester. The student shall opt any one of the domains for practice school declared by the program committee from time to time. At the end of the practice school, every student shall submit a printed report (in triplicate) on the practice school he/she attended (not more than 25 pages). Along with the exams of semester VII, the report submitted by the student, knowledge and skills acquired by the student through practice school shall be evaluated by the subject experts at college level and grade point shall be awarded.

BP801T. BIOSTATISITCS AND RESEARCH METHODOLOGY(Theory)

Teacher/s: Dr. DHP Gowda **45 Hours (3 Hrs/ week)**

Scope: To understand the applications of Biostatics in Pharmacy. This subject deals with descriptive statistics, Graphics, Correlation, Regression, logistic regression Probability theory, Sampling technique, Parametric tests, Non Parametric tests, ANOVA, Introduction to Design of Experiments, Phases of Clinical trials and Observational and Experimental studies, SPSS, R and MINITAB statistical software's, analyzing the statistical data using Excel.

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

• Know the operation of M.S. Excel, SPSS, R and MINITAB®, DoE (Design of Experiment)

• Know the various statistical techniques to solve statistical problems

• Appreciate statistical techniques in solving the problems.

Course Content:

Lecturer wise program

Chapter No.	Title	No. of Hours
1	Introduction: Statistics, Biostatistics, Frequency distribution Measures of central tendency: Mean, Median, Mode- Pharmaceutical examples	**5**
2	Measures of dispersion: Dispersion, Range, standard deviation, Pharmaceutical problems Correlation: Definition, Karl Pearson's coefficient of correlation, Multiple correlation - Pharmaceuticals examples	**5**
3	Regression: Curve fitting by the method of least squares, fitting the lines y= a + bx and x = a + by, Multiple regression, standard error of regression– Pharmaceutical Examples	**5**

4	Poisson's distribution, properties – problems Sample, Population, large sample, small sample, Null hypothesis, alternative hypothesis,Sampling, essence of sampling, types of sampling, Error-I type, Error-II type, Standard error of mean (SEM) - Pharmaceutical examples Parametric test: t-test(Sample, Pooled or Unpaired and Paired) , ANOVA, (One way and Two way), Least Significance difference.	**5**
5	Non Parametric tests: Wilcoxon Rank Sum Test, Mann-Whitney U test, Kruskal-Wallis test, Friedman Test Introduction to Research: Need for research, Need for design of Experiments, Experiential Design Technique, plagiarism Graphs: Histogram, Pie Chart, Cubic Graph, response surface plot, Counter Plot graph	**4**
6	Designing the methodology: Sample size determination and Power of a study, Report writing and presentation of data, Protocol, Cohorts studies, Observational studies, Experimental studies, Designing clinical trial, various phases.	**2**
7	Blocking and confounding system for Two-level factorials Regression modeling: Hypothesis testing in Simple and Multiple regression models	**4**
8	Introduction to Practical components of Industrial and Clinical Trials Problems: Statistical Analysis Using Excel, SPSS, MINITAB®, DESIGN OF EXPERIMENTS, R - Online Statistical Software's to Industrial and Clinical trial approach	**2**
9	Design and Analysis of experiments: Factorial Design: Definition, 22, 23design. Advantage of factorial design	**4**
10	Response Surface methodology: Central composite design, Historical design, Optimization Techniques	**3**

Theory Sessional examination syllabus

Sessional No.	**Syllabus**
	Chapters no.
I	1 to 5
II	6 to 10

Recommended Books (Latest edition):

1. Pharmaceutical statistics- Practical and clinical applications, Sanford Bolton, publisher Marcel Dekker Inc. NewYork.

2. Fundamental of Statistics – Himalaya Publishing House- S.C.Guptha
3. Design and Analysis of Experiments –PHI Learning Private Limited, R. Pannerselvam,
4. Design and Analysis of Experiments – Wiley Students Edition, Douglas and C. Montgomery

BP 802T SOCIAL AND PREVENTIVE PHARMACY (Theory)

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

Scope:

The purpose of this course is to introduce to students a number of health issues and their challenges. This course also introduced a number of national health programmes. The roles of the pharmacist in these contexts are also discussed.

Objectives:

After the successful completion of this course, the student shall be able to:

- Acquire high consciousness/realization of current issues related to health and pharmaceutical problems within the country and worldwide.
- Have a critical way of thinking based on current healthcare development.
- Evaluate alternative ways of solving problems related to health and pharmaceutical issues

Course content

Lecture wise programme

Chapter No.	Title	No. of Hours
1	Concept of health and disease: Definition, concepts and evaluation of public health. understanding the concept of prevention and control of disease, social causes of diseases and social problems of the sick	**5**
2	Social and health education: Food in relation to nutrition and health, Balanced diet, Nutritional deficiencies, Vitamin deficiencies, Malnutrition and its prevention .Sociology and health: Socio cultural	**5**

	factors related to health and disease, Impact of urbanization on health and disease, Poverty and health Hygiene and health: personal hygiene and health care; avoidable	
3	Preventive medicine: General principles of prevention and control of diseases such as cholera, SARS, Ebola virus, influenza, acute respiratory infections, malaria,	**5**
4	Chicken guinea, dengue, lymphatic filariasis, pneumonia, hypertension, diabetes mellitus, cancer, drug addiction-drug substance abuse	**5**
5	National health programs, its objectives, functioning and outcome of the following: HIV AND AIDS control programme, TB, Integrated disease surveillance program IDSP),	**5**
6	National leprosy control programme, National mental health program, National programme for prevention and control of deafness, Universal immunization programme, National programme for control of blindness, Pulse polio programme	**5**
7	National health intervention programme for mother and child, National family welfare programme,	**5**
8	National tobacco control programme, National Malaria Prevention Program, National programme for the health care for the elderly, Social health programme; role of WHO in Indian national program	**3**
9	Community services in rural, urban and school health: Functions of PHC, Improvement in rural sanitation,	**5**
10	National urban health mission, Health promotion and education in school.	**2**

Theory Sessional examination syllabus

Sessional No.	**Syllabus**
	Chapters no.
I	1 to 5
II	6 to 10

Recommended Books (Latest edition):

1. Short Textbook of Preventive and Social Medicine, Prabhakara GN, 2nd Edition,2010, ISBN: 9789380704104, JAYPEE Publications

2. Textbook of Preventive and Social Medicine (Mahajan and Gupta), Edited by Roy Rabindra Nath, Saha Indranil, 4th Edition, 2013, ISBN: 9789350901878, JAYPE Publications

3. Review of Preventive and Social Medicine (Including Biostatistics), Jain Vivek, 6th Edition, 2014, ISBN: 9789351522331, JAYPEE Publications

4. Essentials of Community Medicine—A Practical Approach, Hiremath Lalita D, Hiremath Dhananjaya A, 2nd Edition, 2012, ISBN: 9789350250440, JAYPEE Publications

5. Park Textbook of Preventive and Social Medicine, K Park, 21st Edition, 2011,ISBN-14: 9788190128285, BANARSIDAS BHANOT PUBLISHERS.

6. Community Pharmacy Practice, Ramesh Adepu, BSP publishers, Hyderabad Recommended Journals:Research in Social and Administrative Pharmacy, Elsevier, Ireland

BP803ET. PHARMA MARKETING MANAGEMENT (Theory)

Teacher/s: Mr. Hemanth Kumar S **45 Hours (3 Hrs/ week)**

Scope:

The pharmaceutical industry not only needs highly qualified researchers, chemists and, technical people, but also requires skilled managers who can take the industry forward by managing and taking the complex decisions which are imperative for the growth of the industry. The Knowledge and Know-how of marketing management groom the people for taking a challenging role in Sales and Product management.

Objective:

The course aims to provide an understanding of marketing concepts and techniques and their applications in the pharmaceutical industry.

Course content

Lecture wise programme

Chapter No.	Title	No. of Hours
1	Marketing: Definition, general concepts and scope of marketing; Distinction between marketing & selling; Marketing environment; Industry and competitive analysis; Analyzing consumer buying behavior; industrial buying behaviour.	**5**

2	Pharmaceutical market: Quantitative and qualitative aspects; size and composition of the market; demographic descriptions and socio-psychological characteristics of the consumer; market segmentation& targeting.Consumer profile; Motivation and prescribing habits of the physician; patients' choice of physician and retail pharmacist.Analyzing the Market;Role of market research	**5**
3	Product decision: Classification, product line and product mix decisions, product life cycle,product portfolio analysis; product positioning; New product decisions;	**5**
4	Product branding, packaging and labeling decisions, Product management in pharmaceutical industry.	**5**
5	Promotion: Methods, determinants of promotional mix, promotional budget.	**5**
6	An overview of personal selling, advertising, direct mail, journals, sampling, retailing, medical exhibition, public relations, online promotional techniques for OTC Products.	**5**
7	Pharmaceutical marketing channels: Designing channel, channel members, selecting the appropriate channel, conflict in channels, physical distribution management: Strategic importance, tasks in physical distribution management.	**5**
8	Professional sales representative (PSR): Duties of PSR, purpose of detailing, selection and training, supervising, norms for customer calls, motivating, evaluating, compensation and future prospects of the PSR	**5**
9	Pricing: Meaning, importance, objectives, determinants of price; pricing methods and strategies, issues in price management in pharmaceutical industry. An overview of DPCO (Drug Price Control Order)and NPPA (National Pharmaceutical Pricing Authority).	**5**
10	Emerging concepts in marketing: Vertical & Horizontal Marketing; Rural Marketing; Consumerism; Industrial Marketing; Global Marketing.	**5**

Theory Sessional examination syllabus

Sessional No.	**Syllabus**
	Chapters no.
I	1 to 5
II	6 to 10

Recommended Books: (Latest Editions)

1. Philip Kotler and Kevin Lane Keller: Marketing Management, Prentice Hall of India, New Delhi
2. Walker, Boyd and Larreche : Marketing Strategy- Planning and Implementation, Tata MC Graw Hill, New Delhi.
3. Dhruv Grewal and Michael Levy: Marketing, Tata MC Graw Hill
4. Arun Kumar and N Menakshi: Marketing Management, Vikas Publishing, India
5. Rajan Saxena: Marketing Management; Tata MC Graw-Hill (India Edition)
6. Ramaswamy, U.S & Nanakamari, S: Marketing Managemnt: Global Perspective, Indian Context, Macmilan India, New Delhi.
7. Shanker, Ravi: Service Marketing, Excell Books, New Delhi
8. Subba Rao Changanti, Pharmaceutical Marketing in India (GIFT – Excel series) Excel Publications.

BP804 ET: PHARMACEUTICAL REGULATORY SCIENCE (Theory)

Teacher/s: Dr. Amit B patil **45 Hours (3 Hrs/ week)**

Scope: This course is designed to impart the fundamental knowledge on the regulatory for approval of new drugs, and drug products in regulated markets of India & other countries like US, EU, Japan, Australia, UK etc. It prepares the students to learn in detail on the regulatory requirements, documentation requirements, and registration procedures for marketing the drug products.

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

- Know about the process of drug discovery and development
- Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
- Know the regulatory approval process and their registration in Indian and international markets

Course content

Lecture wise programme

Chapter No.	Title	No. of Hours
1	New Drug Discovery and development Stages of drug discovery, Drug development process, pre-clinical studies, non-clinical activities, clinical studies	5

2	Innovator and generics, Concept of generics, Generic drug product development.	**5**
3	Regulatory Approval Process Approval processes and timelines involved in Investigational New Drug (IND), New Drug Application (NDA), Abbreviated New Drug Application (ANDA). Changes to an approved NDA / ANDA)	**5**
4	Regulatory authorities and agencies Overview of regulatory authorities of India, United States, European Union, Australia, Japan, Canada (Organization structure and types of applications	**5**
5	Registration of Indian drug product in overseas market Procedure for export of pharmaceutical products, Technical documentation, Drug Master	**5**
6	Files (DMF), Common Technical Document (CTD), electronic Common Technical Document (eCTD), ASEAN Common Technical Document (ACTD)research.	**5**
7	Clinical trials Developing clinical trial protocols, Institutional Review Board / Independent Ethics. committee - formation and working procedures, Informed consent process and procedures,	**5**
8	GCP obligations of Investigators, sponsors & Monitors, Managing and Monitoring clinical trials, Pharmacovigilance – safety monitoring in clinical trials	**3**
9	Regulatory Concepts, Basic terminology, guidance, guidelines, regulations, Laws and Acts,	**5**
10	Orange book, Federal Register, Code of Federal Regulatory, Purple book	**2**

Theory Sessional examination syllabus

Sessional No.	**Syllabus**
	Chapters no.
I	1 to 5
II	6 to 10

Recommended books (Latest edition):

1. Drug Regulatory Affairs by Sachin Itkar, Dr. N.S. Vyawahare, Nirali Prakashan.

2. The Pharmaceutical Regulatory Process, Second Edition Edited by Ira R. Berry and Robert P. Martin, Drugs and the Pharmaceutical Sciences,Vol.185. Informa Health care Publishers.
3. New Drug Approval Process: Accelerating Global Registrations By Richard A Guarino, MD, 5th edition, Drugs and the Pharmaceutical Sciences,Vol.190.
4. Guidebook for drug regulatory submissions / SandyWeinberg. By John Wiley & Sons. Inc.
5. FDA Regulatory Affairs: a guide for prescription drugs, medical devices, and biologics /edited by Douglas J. Pisano, David Mantus.
6. Generic Drug Product Development, Solid Oral Dosage forms, Leon Shargel and Isader Kaufer, Marcel Dekker series, Vol.143
7. Clinical Trials and Human Research: A Practical Guide to Regulatory Compliance By Fay A. Rozovsky and Rodney K. Adams
8. Principles and Practices of Clinical Research, Second Edition Edited by John I. Gallin and Frederick P. Ognibene
9. Drugs: From Discovery to Approval, Second Edition By Rick N

BP 805T: PHARMACOVIGILANCE (Theory)

Teacher/s: Dr. Juny Sebastian **45 Hours (3 Hrs/ week)**

Scope: This paper will provide an opportunity for the student to learn about development of pharmacovigilance as a science, basic terminologies used in pharmacovigilance, global scenario of Pharmacovigilance, train students on establishing pharmacovigilance programme in an organization, various methods that can be used to generate safety data and signal detection. This paper also develops the skills of classifying drugs, diseases and adverse drug reactions.

Objectives: At completion of this paper it is expected that students will be able to (know, do, and appreciate):

- Importance of drug safety monitoring
- History and development of pharmacovigilance
- National and international scenario of pharmacovigilance
- Dictionaries, coding and terminologies used in pharmacovigilance
- Detection of new adverse drug reactions and their assessment
- International standards for classification of diseases and drugs
- Adverse drug reaction reporting systems and communication in pharmacovigilance
- Methods to generate safety data during pre clinical, clinical and post approval phases of drugs' life cycle
- Drug safety evaluation in paediatrics, geriatrics, pregnancy and lactation

- Pharmacovigilance Program of India (PvPI) requirement for ADR reporting in India
- ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning
- CIOMS requirements for ADR reporting
- Writing case narratives of adverse events and their quality.

Course content

Lecture wise programme

Chapter No.	Title	No. of Hours
1	**Introduction to Pharmacovigilance** • History and development of Pharmacovigilance • Importance of safety monitoring of Medicine • WHO international drug monitoring programme • Pharmacovigilance Program of India (PvPI)	**4**
2	**Introduction to adverse drug reactions** • Definitions and classification of ADRs • Detection and reporting • Methods in Causality assessment • Severity and seriousness assessment • Predictability and preventability assessment • Management of adverse drug reactions **Basic terminologies used in pharmacovigilance** • Terminologies of adverse medication related events • Regulatory terminologies	**6**
3	**Drug and disease classification** • Anatomical, therapeutic and chemical classification of drugs • International classification of diseases • Daily defined doses • International Non proprietary Names for drugs **Drug dictionaries and coding in pharmacovigilance** • WHO adverse reaction terminologies • MedDRA and Standardised MedDRA queries • WHO drug dictionary • Eudravigilance medicinal product dictionary	**6**

4	**Information resources in pharmacovigilance** • Basic drug information resources • Specialised resources for ADRs **Establishing pharmacovigilance programme** • Establishing in a hospital • Establishment & operation of drug safety department in industry • Contract Research Organisations (CROs) • Establishing a national programme	**4**
5	**Vaccine safety surveillance** • Vaccine Pharmacovigilance • Vaccination failure • Adverse events following immunization **Pharmacovigilance methods** • Passive surveillance – Spontaneous reports and case series • Stimulated reporting • Active surveillance – Sentinel sites, drug event monitoring and registries. • Comparative observational studies – Cross sectional study, case control study and cohort study • Targeted clinical investigations	**7**
6	**Communication in pharmacovigilance** • Effective communication in Pharmacovigilance • Communication in Drug Safety Crisis management • Communicating with Regulatory Agencies, Business Partners, Healthcare facilities & Media	**3**
7	**Safety data generation** • Pre clinical phase • Clinical phase • Post approval phase (PMS)	**2**
8	**ICH Guidelines for Pharmacovigilance** • Organization and objectives of ICH • Expedited reporting • Individual case safety reports • Periodic safety update reports • Post approval expedited reporting	**6**

	• Pharmacovigilance planning • Good clinical practice in pharmacovigilance studies	
9	**Pharmacogenomics of adverse drug reactions** • Genetics related ADR with example focusing PK parameters. **Drug safety evaluation in special population** • Paediatrics • Pregnancy and lactation • Geriatrics	**3**
10	**CIOMS** • CIOMS Working Groups • CIOMS Form **CDSCO (India) and Pharmacovigilance** • D&C Act and Schedule Y • Differences in Indian and global pharmacovigilance requirements	**4**

Theory Sessional examination syllabus

Sessional No.	**Syllabus**
	Chapters no.
I	1 to 4 & 6
II	5,7 to 9

Recommended Books (Latest edition):

1. Textbook of Pharmacovigilance: S K Gupta, Jaypee Brothers, Medical Publishers.

2. Practical Drug Safety from A to Z By Barton Cobert, Pierre Biron, Jones and Bartlett Publishers.

3. Mann's Pharmacovigilance:Elizabeth B. Andrews, Nicholas, Wiley Publishers.

4. Stephens' Detection of New Adverse Drug Reactions: John Talbot, Patrick Walle, Wiley Publishers.

5. An Introduction to Pharmacovigilance: Patrick Waller,Wiley Publishers.

6. Cobert's Manual of Drug Safety and Pharmacovigilance: Barton Cobert,Jones& Bartlett Publishers.

7. Textbook of Pharmacoepidemiolog edited by Brian L. Strom, Stephen E Kimmel, Sean Hennessy,Wiley Publishers.

8. A Textbook of Clinical Pharmacy Practice -Essential Concepts and Skills:G. Parthasarathi, Karin NyfortHansen,Milap C. Nahata

9. National Formulary of India
10. Text Book of Medicine by Yashpal Munjal
11. Text book of Pharmacovigilance: concept and practice by GP Mohanta and PK Manna

BP 806 ET. QUALITY CONTROL AND STANDARDIZATION OF HERBALS

Teacher/s: Dr.N Paramakrishnan & Dr. J suresh 45 Hours (3 Hrs/ week)

Scope: In this subject the student learns about the various methods and guidelines for evaluation and standardization of herbs and herbal drugs. The subject also provides an opportunity for the student to learn cGMP, GAP and GLP in traditional system of medicines.

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

- know WHO guidelines for quality control of herbal drugs
- know Quality assurance in herbal drug industry
- know the regulatory approval process and their registration in Indian and international markets
- Appreciate EU and ICH guidelines for quality control of herbal drugs

Course content

Lecture wise programme

Chapter No.	Title	No. of Hours
1	Basic tests for drugs – Pharmaceutical substances, Medicinal plants materials and dosage forms	**5**
2	WHO guidelines for quality control of herbal drugs. Evaluation of commercial crude drugs intended for use	**5**
3	Quality assurance in herbal drug industry of cGMP, GAP, GMP and GLP in traditional system of medicine.	**5**
4	WHO Guidelines on current good manufacturing Practices (cGMP) for Herbal Medicines WHO Guidelines on GACP for Medicinal Plants	**5**
5	EU and ICH guidelines for quality control of herbal drugs.	**5**
6	Research Guidelines for Evaluating the Safety and Efficacy of Herbal Medicines	**5**
7	Stability testing of herbal medicines.Application of various chromatographic techniques in standardization of herbal products.	**5**

8	Preparation of documents for new drug application and export registration GMP requirements and Drugs & Cosmetics Act provisions	**3**
9	Regulatory requirements for herbal medicines. WHO guidelines on safety monitoring of herbal medicines in pharmacovigilance systems	**5**
10	Comparison of various Herbal Pharmacopoeias. Role of chemical and biological markers in standardization of herbal products	**2**

Theory Sessional examination syllabus

Sessional No.	**Syllabus**
	Chapters no.
I	1 to 5
II	6 to 10

Recommended Books: (Latest Editions)

1. Pharmacognosy by Trease and Evans
2. Pharmacognosy by Kokate, Purohit and Gokhale
3. Rangari, V.D., Text book of Pharmacognosy and Phytochemistry Vol. I , Carrier Pub., 2006.
4. Aggrawal, S.S., Herbal Drug Technology. Universities Press, 2002.
5. EMEA. Guidelines on Quality of Herbal Medicinal Products/Traditional Medicinal Products,
6. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002.
7. Shinde M.V., Dhalwal K., Potdar K., Mahadik K. Application of quality control principles to herbal drugs. International Journal of Phytomedicine 1(2009); p. 4-8.
8. WHO. Quality Control Methods for Medicinal Plant Materials,World Health Organization, Geneva, 1998. WHO. Guidelines for the Appropriate Use of Herbal Medicines. WHO Regional Publications, Western Pacific Series No 3, WHO Regional office for the Western Pacific, Manila, 1998.
9. WHO. The International Pharmacopeia, Vol. 2: Quality Specifications, 3rd edn. World Health Organization, Geneva, 1981.
10. WHO. Quality Control Methods for Medicinal Plant Materials. World Health Organization, Geneva, 1999.
11. WHO. WHO Global Atlas of Traditional, Complementary and Alternative Medicine. 2 vol. set. Vol. 1 contains text and Vol. 2, maps. World Health Organization, Geneva, 2005.
12. WHO. Guidelines on Good Agricultural and Collection Practices (GACP) for Medicinal Plants. World Health Organization, Geneva, 2004.

BP 807 ET. COMPUTER AIDED DRUG DESIGN (Theory)

Teacher/s: Dr. Prashanth Kumar / Dr. Durai Anand Kumar 45 Hours (3 Hrs/ week)

Scope: This subject is designed to provide detailed knowledge of rational drug design process and various techniques used in rational drug design process.

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

- Design and discovery of lead molecules
- The role of drug design in drug discovery process
- The concept of QSAR and docking
- Various strategies to develop new drug like molecules.
- The design of new drug molecules using molecular modelling software

Course content

Lecture wise programme

Chapter No.	Title	No. of Hours
1	Introduction to Drug Discovery and Development Stages of drug discovery and development Lead discovery and Analog Based Drug Design Rational approaches to lead discovery based on traditional medicine, Random screening,	**5**
2	Non-random screening, serendipitous drug discovery, lead discovery based on drug metabolism, lead discovery based on clinical observation. Analog Based Drug Design: Bioisosterism, Classification, Bioisosteric replacement. Any three case studies	**5**
3	Quantitative Structure Activity Relationship (QSAR) SAR versus QSAR, History and development of QSAR, Types of physicochemical parameters,	**5**
4	Experimental and theoretical approaches for the determination of physicochemical parameters such as Partition coefficient, Hammet's substituent constant and Tafts steric constant. Hansch analysis, Free Wilson analysis, 3D-QSAR approaches like COMFA and COMSIA	**5**
5	Molecular Modeling and virtual screening techniques Virtual Screening techniques: Drug likeness screening, Concept of pharmacophore mapping and pharmacophore based Screening,	**5**

6	Molecular docking: Rigid docking, flexible docking, manual docking, Docking based screening. De novo drug design	**5**
7	Informatics & Methods in drug design Introduction to Bioinformatics, chemoinformatics.	**5**
8	ADME databases, chemical, biochemical and pharmaceutical databases.	**3**
9	Molecular Modeling: Introduction to molecular mechanics and quantum mechanics.Energy	**5**
10	Minimization methods and Conformational Analysis, global conformational minima determination	**2**

Theory Sessional examination syllabus

Sessional No.	**Syllabus**
	Chapters no.
I	1 to 5
II	6 to 10

Recommended Books (Latest Editions)

1. Robert GCK, ed., "Drug Action at the Molecular Level" University Prak Press Baltimore.
2. Martin YC. "Quantitative Drug Design" Dekker, New York.
3. Delgado JN, Remers WA eds "Wilson & Gisvolds's Text Book of Organic Medicinal & Pharmaceutical Chemistry" Lippincott, New York.
4. Foye WO "Principles of Medicinal chemistry 'Lea & Febiger.
5. Koro lkovas A, Burckhalter JH. "Essentials of Medicinal Chemistry" Wiley Interscience.
6. Wolf ME, ed "The Basis of Medicinal Chemistry, Burger's Medicinal Chemistry" JohnWiley& Sons, New York.
7. Patrick Graham, L., An Introduction to Medicinal Chemistry, Oxford University Press.
8. Smith HJ, Williams H, eds, "Introduction to the principles of Drug Design" Wright Boston.
9. Silverman R.B. "The organic Chemistry of Drug Design and Drug Action" Academic Press New York.

BP808ET: CELL AND MOLECULAR BIOLOGY (Elective subject)

Teacher/s: Dr.S.N Manjula **45 Hours (3 Hrs/ week)**

Scope:

Cell biology is a branch of biology that studies cells – their physiological properties, their structure, the organelles they contain, interactions with their environment, their life cycle, division, death and cell function. This is done both on a microscopic and molecular level. Cell biology research encompasses both the great diversity of single-celled organisms like bacteria and protozoa, as well as the many specialized cells in multi-cellular organisms such as humans, plants, and sponges.

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

- Summarize cell and molecular biology history.
- Summarize cellular functioning and composition.
- Describe the chemical foundations of cell biology.
- Summarize the DNA properties of cell biology.
- Describe protein structure and function.
- Describe cellular membrane structure and function.
- Describe basic molecular genetic mechanisms.
- Summarize the Cell Cycle

Course content

Lecture wise programme

Chapter No.	Title	No. of Hours
1	Cell and Molecular Biology: Definitions theory and basics and Applications. Cell and Molecular Biology:	**5**
2	History and Summation. Properties of cells and cell membrane. Prokaryotic versus Eukaryotic Cellular Reproduction Chemical Foundations – an Introduction and Reactions (Types)	**5**
3	DNA and the Flow of Molecular Information DNA Functioning	**5**
4	DNA and RNA Types of RNA Transcription and Translation	**5**
5	Proteins: Defined and Amino Acids Protein Structure Regularities in Protein Pathways	**5**
6	Cellular Processes Positive Control and significance of Protein Synthesis	**5**
7	Science of Genetics Transgenics and Genomic Analysis Cell Cycle analysis Mitosis and Meiosis	**5**
8	Cellular Activities and Checkpoints	**3**

9	Cell Signals: Introduction Receptors for Cell Signals Signaling Pathways.	**5**
10	Overview Misregulation of Signaling Pathways Protein-Kinases: Functioning	**2**

Theory Sessional examination syllabus

Sessional No.	**Syllabus**
	Chapters no.
I	1 to 5
II	6 to 10

Recommended Books (latest edition):

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. Edward: Fundamentals of Microbiology.
10. N.K.Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi
11. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company
12. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of RecombinantDNA: ASM Press Washington D.C.

BP809ET. COSMETIC SCIENCE (Theory)

Teacher/s: Mr. B. Mahendran **45 Hours (3 Hrs./ week)**

Course content

Lecture wise programme

Chapter No.	**Title**	**No. of Hours**

1	Classification of cosmetic and cosmeceutical products Definition of cosmetics as per Indian and EU regulations, Evolution of cosmeceuticals from cosmetics, cosmetics as quasi and OTC drugs Cosmetic excipients	**5**
2	Surfactants, rheologymodifiers, humectants, emollients, preservatives. Classification and application Skin: Basic structure and function of skin. Hair: Basic structure of hair. Hair growth cycle. Oral Cavity: Common problem associated with teeth and gums	**5**
3	Principles of formulation and building blocks of skin care products: Face wash, Moisturizing cream, Cold Cream, Vanishing cream and their advantages and disadvantages .Application of these products in formulation of cosmecuticals. Antiperspants & deodorants- Actives & mechanism of action.	**5**
4	Principles of formulation and building blocks of Hair care products: Conditioning shampoo, Hair conditioner,anti-dandruff shampoo. Hair oils. Chemistry and formulation of Para-phylene diamine based hair dye. Principles of formulation and building blocks of oral care products: Toothpaste for bleeding gums, sensitive teeth. Teeth whitening, Mouthwash	**5**
5	Sun protection, Classification of Sunscreens and SPF. Role of herbs in cosmetics: Skin Care: Aloe and turmeric Hair care: Henna and amla. Oral care: Neem and clove Analytical cosmetics	**5**
6	BIS specification and analytical methods for shampoo, skincream and toothpaste	**5**
7	Principles of Cosmetic Evaluation: Principles of sebumeter, corneometer. Measurement of TEWL, Skin Color	**5**
8	Hair tensile strength, Hair combing properties Soaps,and syndet bars. Evolution and skin benefits.	**3**
9	Oily and dry skin, causes leading to dry skin, skin moisturisation. Basic understanding of the terms Comedogenic, dermatitis. Cosmetic problems associated with Hair and scalp	**5**
10	Dandruff, Hair fall causes Cosmetic problems associated with skin: blemishes, wrinkles, acne, prickly heat and body odor. Antiperspirants and Deodorants-Actives and mechanism of action	**2**

Theory Sessional examination syllabus

Sessional No.	Syllabus

	Chapters no.
I	1 to 5
II	6 to 10

References

1) Harry's Cosmeticology, Wilkinson, Moore, Seventh Edition, George Godwin.

2) Cosmetics – Formulations, Manufacturing and Quality Control, P.P. Sharma, 4th Edition, Vandana Publications Pvt. Ltd., Delhi.

3) Text book of cosmelicology by Sanju Nanda & Roop K. Khar, Tata Publishers.

BP810 ET. PHARMACOLOGICAL SCREENING METHODS

Teacher/s: Dr. K. S Nagashree **45 Hours (3 Hrs/ week)**

Scope: This subject is designed to impart the basic knowledge of preclinical studies in experimental animals including design, conduct and interpretations of results.

Objectives

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

- Appreciate the applications of various commonly used laboratory animals.
- Appreciate and demonstrate the various screening methods used in preclinical research
- Appreciate and demonstrate the importance of biostatistics and research methodology
- Design and execute a research hypothesis independently

Course content

Lecture wise programme

Chapter No.	Title	No. of Hours
1	Laboratory Animals: Study of CPCSEA and OECD guidelines for maintenance, breeding and conduct of experiments on laboratory animals, Common lab animals.	**5**
2	Description and applications of different species and strains of animals. Popular transgenic and mutant animals. Techniques for collection of blood	**3**

	and common routes of drug administration in laboratory animals, Techniques of blood collection and euthanasia	
3	Preclinical screening models . Introduction: Dose selection, calculation and conversions, preparation of drug solution/suspensions, grouping of animals and importance of sham negative and positive control groups. Rationale for selection of animal species and sex for the study.	**5**
4	Study of screening animal models for Diuretics, nootropics, anti-Parkinson's ,antiasthmatics, Preclinical screening models: for CNS activity- analgesic, antipyretic, anti-inflammatory, general anaesthetics, sedative and hypnotics, antipsychotic, antidepressant, antiepileptic, antiparkinsonism, alzheimer's disease	**5**
5	Preclinical screening models: for ANS activity, sympathomimetics, sympatholytics, parasympathomimetics, parasympatholytics,	**5**
6	Skeletal muscle relaxants, drugs acting on eye, local anaethetics	**2**
7	Preclinical screening models: for CVS activity- antihypertensives, diuretics, antiarrhythmic, antidyslepidemic, anti aggregatory, coagulants, and anticoagulants	**3**
8	Preclinical screening models for other important drugs like antiulcer, antidiabetic, anticancer and antiasthmatics. Research methodology and Bio-statistics Selection of research topic, review of literature, research hypothesis and study design Pre-clinical data analysis and interpretation using Students 't' test and One-way ANOVA. Graphical representation of data	**2**

Theory Sessional examination syllabus

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

Recommended Books (latest edition):

1. Fundamentals of experimental Pharmacology-byM.N.Ghosh
2. Hand book of Experimental Pharmacology-S.K.Kulakarni
3. CPCSEA guidelines for laboratory animal facility.
4. Drug discovery and Evaluation by Vogel H.G.

5. Drug Screening Methods by Suresh Kumar Gupta and S. K. Gupta
6. Introduction to biostatistics and research methods by PSS Sundar Rao and J Richard.

BP 811 ET. ADVANCED INSTRUMENTATION TECHNIQUES (Theory)

Teacher/s: Dr. R.S Chandan **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 advanced knowledge on the principles and instrumentation of spectroscopic and chromatographic hyphenated techniques. 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

- understand the advanced instruments used and its applications in drug analysis
- understand the chromatographic separation and analysis of drugs.
- understand the calibration of various analytical instruments
- know analysis of drugs using various analytical instruments.

Course content

Lecture wise programme

Chapter No.	Title	No. of Hours
1	Nuclear Magnetic Resonance spectroscopy Principles of H-NMR and C-NMR, chemical shift, factors affecting chemical shift, coupling constant, Spin - spin coupling, relaxation, instrumentation and applications Mass Spectrometry- Principles,	**5**
2	Fragmentation, Ionization techniques – Electron impact, chemical ionization, MALDI, FAB, Analyzers-Time of flight and Quadrupole, instrumentation, applications	**5**
3	Thermal Methods of Analysis: Principles, instrumentation and applications of Thermo gravimetric Analysis (TGA), Differential Thermal Analysis (DTA), Differential Scanning Calorimetry (DSC) X-Ray Diffraction Methods	**5**
4	Origin of X-rays, basic aspects of crystals, Xray Crystallography, rotating crystal technique, single crystal diffraction ,powder diffraction, structural elucidation and applications	**5**
5	Calibration and validation-as per ICH and USFDA guidelines	**5**
6	Calibration of following Instruments	**5**

	Electronic balance, UV-Visible spectrophotometer, IR spectrophotometer, Fluorimeter, Flame Photometer, HPLC and GC	
7	Radio immune assay: Importance, various components, Principle, different methods, Limitation and Applications of Radio immuno assay	**5**
8	Extraction techniques:General principle and procedure involved in the solid phase extraction and liquid-liquid extraction	**3**
9	Hyphenated techniques-LC-MS/MS,	**5**
10	GC-MS/MS, HPTLC-MS	**2**

Theory Sessional examination syllabus

Sessional No.	**Syllabus**
	Chapters no.
I	1 to 5
II	6 to 10

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 Silversteier

JSS Academy of Higher Education & Research

JSS College of Pharmacy

Sri ShivarathreeshwaraNagara, Mysore-570015

MODIFIED CLASSTIME TABLE – 2021-22

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 - VIII)

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
Monday	----------	----------		----------	AIT-RSC COSECT-BM Cell Mole Bio-SNM PRS-ABP		CADD – BRP PMARK-HKS P. Vigilance -JUS	CADD – BRP PMARK-HKS P. Vigilance		AIT -RSC Expt.P. Col-KSN
Tuesday	----------	----------+-		PMARK-HKS Expt.P. Col-KSN	Cell Mole Bio-SNM PRC-ABP		QC&SHERBALS JS PPD – RAO	QC&SHERBALS JS PPD - RAO		BS&RM DHP
Wednesday		----------		Cell Mole Bio-SNM COSME-BM AIT -RSC	Cell Mole Bio-SNM AIT-RSC		Social & PM -UM	COSECT-BM PRS-ABP		BS&RM -DHP
Thursday	----------	----------			QC&SHERBALS NPK PPD - RAO		PRC-ABP	Social & PM UM		BS&RM DHP
Friday	----------	----------			----------		Social & PM UM	Social & PM(Tu) UM		BS&RM(Tu) DHP
Saturday		PMARK-HKS-LH3 P. Vig-JUS-LH7 Expt.P. Col-KSN		CADD–DAK P. Vig-JUS Expt.P. Col-KSN	COSME-BM CADD -DAK QC&SHERBALS-NPK PPD - RAO		----------			

***Effective from: March 21st - 2022**

Note: 1. No tea break for practical's

Time table Coordinator **Principal**

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