

JSS Academy of Higher Education and Research

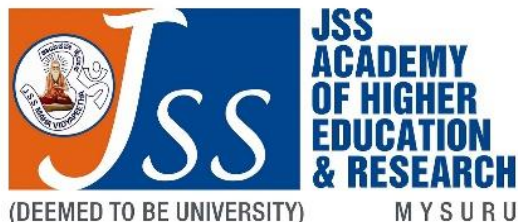
## JSS College of Pharmacy

Sri Shivarathreshwara Nagara, Mysuru-570015

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**An ISO 9001:2015 Certified Institution**



### 1<sup>st</sup> Pharm.D. Course Handout 2023-24

|  |   |  |  |  |   |  |   |
|--|---|--|--|--|---|--|---|
| <br><b>NAAC</b><br>NATIONAL ASSESSMENT AND ACCREDITATION COUNCIL<br><b>A+</b>   | <br><b>nirf</b> NATIONAL INSTITUTIONAL RANKING FRAMEWORK 2023<br><b>34<sup>th</sup></b><br>University Category | <br><b>THE WORLD UNIVERSITY RANKINGS 2023</b><br>351-400 2 <sup>nd</sup> in INDIA<br>Subject Ranking - Clinical & Health<br>126-150 | <br><b>QS WORLD UNIVERSITY RANKINGS 2023</b><br>QS ASIA RANKING<br>301-350<br>Southern Asia<br>65 | <br><b>QS WORLD UNIVERSITY RANKINGS BY SUBJECT   2023</b><br>Pharmacy & Pharmacology<br>101-150<br>Medicine<br>651-680 | <br><b>Impact Ranking</b><br>301-400<br>SDG - 3 Good Health & Wellbeing<br>16 <sup>th</sup> Globally<br>1 <sup>st</sup> in INDIA | <br><b>QS I-GAUGE</b><br>Advanced E-Learning<br>Excellence for Academic Digitisation (E-LEAD) | <br><b>ACCREDITATION COUNCIL FOR PHARMACY EDUCATION</b><br>1 <sup>st</sup> in the Asia Pacific<br>ACPE certified Pharm.D Program |
|  2023   JSS Medical College - 37 <sup>th</sup> ★ JSS Dental College & Hospital - 11 <sup>th</sup> ★ JSS College of Pharmacy, Mysuru - 7 <sup>th</sup> ★ JSS College of Pharmacy, Ooty - 4 <sup>th</sup> |   |  |  |  |   |  |   |

## **Vision:**

To be a leader in Pharmacy Education, Training and Research to Transform Individuals and Society

## **Mission:**

- To educate and inspire diverse group of future pharmacists and pharmaceutical scientists to be a leader in pharmaceutical sciences and pharmacy practice.
- To provide conducive environment and infrastructure that motivate and enable individuals to excel in research that benefits the society.
- To train and empower the individuals to advance the public health through quality pharmaceutical care services.
- To reach out the public through outreach programs to meet the changing needs of the society.
- To contribute to a sustainable future by adopting innovative technologies and advance pharmacy education and training.

## **Academic Calendar 2023-24**

### **Tentative Dates of Examinations**

|   |   |
|---|---|
| I Sessional Examinations for II to V Pharm D<br>& I Pharm D | 6 <sup>th</sup> September 2023 &<br>23 <sup>rd</sup> September 2023 |
| II Sessional Examinations for I to V Pharm D                | 18 <sup>th</sup> Dec 2023   |
| III Sessional Examinations for I to V Pharm D               | 18 <sup>th</sup> March 2024   |
| University Examination                                      | 1 <sup>st</sup> April 2024  |

### **(Pharm D – 1<sup>st</sup> Year)**

#### **Teacher's Incharge**

| <b>Class</b> | <b>Class Teacher</b>         | <b>Batch No.</b> | <b>Batch Teacher</b>      |
|--------------|------------------------------|------------------|---------------------------|
| I Pharm.D.   | Dr. B.R. Prashantha<br>Kumar | I                | Dr. B.R. Prashantha Kumar |
|              |                              | II               | Dr. Trideva Sastri K      |

## ACTIVITIES AND COORDINATORS 2023-24

| Sl. No | Activities   | Coordinator/s  | Tentative schedule of meeting/activity  |
|--------|--|--|---|
| 1.     | Induction, learning skills, and personality development programs for freshers' day   | Coordinator: AKT<br>Members: BRJ, DT   | July/August 2023  |
| 2.     | Anti-ragging cell  | Coordinators: JS, KSN, & Committee members   | July/August 2023  |
| 3.     | Grievance and redressal cell   | Coordinator: GVP & Committee members   | Meetings - twice/year   |
| 4.     | Gender Sensitization Committee   | Coordinator: SNM & Committee members   | Meetings - twice/year   |
| 5.     | Industrial Visits, Training, and placements  | Coordinator: ABP<br>Members: MGS, SM, SD, LR, UM   | September 2023- June 2024   |
| 6.     | Internal Quality Assurance Cell (IQAC) Team  | Chairman- GVP<br>Coordinator- HVG<br>Member Secretary: SP<br>Members: RSC, MPV, KSN, CIA, HP | 4 meetings/year   |
| 7.     | Guest lecture & Seminar/ Conference/ Training / Workshop/Webinar organized at college / delivered/ attended by staff- Validation of college data.                                | IQAC Team  | Throughout the academic year  |
| 8.     | Governing council meeting  | GVP + IQAC Team<br>AAO & Asha B  | July 2023 and Feb 2024  |
| 9.     | Preparation of documents and submission for NIRF, NAAC, NBA, PCI or any other agency   | Team IQAC  | <ul style="list-style-type: none"> <li>• Throughout the academic year</li> </ul>                                      |
| 10.    | Internal Assessment Committee (IAC)  | Coordinator: GVP<br>Members: All program Coordinators (M Pharm, B. Pharm, D Pharm, Pharm D)  | Meetings - twice/year<br>Schedule as per the academic calendar  |
| 11.    | ACPE committee- Interim report and others  | Coordinator: MR /RSS<br>Member: SP & UM  | <ul style="list-style-type: none"> <li>• As required</li> </ul>   |
| 12.    | Academic Council Board (ACB) <ul style="list-style-type: none"> <li>• Student Progression (Advanced/ Medium/ Slow learners)</li> <li>• Mentors Diary- Student profile</li> </ul> | Class teachers and Program Coordinators  | <ul style="list-style-type: none"> <li>• After each sessional exam</li> <li>• Regular monitoring of Mentee</li> </ul> |

|     |   |   |   |
|-----|---|---|---|
| 13. | Ethics committee  | <ul style="list-style-type: none"> <li>IAEC-SBC</li> <li>IEC-CSH</li> </ul> | <ul style="list-style-type: none"> <li>Twice a year</li> </ul>                                |
| 14. | Class Timetable committee   | Coordinator: VJ<br>Member: BRP, NPK,<br>URR, DT                             | <ul style="list-style-type: none"> <li>Twice a year (June &amp; Nov 2023)</li> </ul>          |
| 15. | Women's cell/Prevention of Sexual Harassment Cell/Internal Complaints committee (ICC)   | SNM & committee members   | <ul style="list-style-type: none"> <li>Meetings twice a year (June &amp; Nov 2023)</li> </ul> |
| 16. | Scholarship Bureau  | Coordinator: RSC<br>Member: SRD   | Soon after the announcement of the Scholarships   |
| 17. | Compilation of publications (Research papers/ books/chapters)   | Coordinator: SRD  | 1st of Every month  |
| 18. | Research Coordination & Consultancy Committee<br>Compilation of Ph.D. details and funded projects<br>Review of publications<br>Collaboration with Industries/organizations<br>Interdepartmental/ Interdisciplinary research | Chairman-SBC<br>Members-All HoDs  | At least 3 meetings/year  |
| 19. | Department Academic Integrity Panel (DAIP) - Plagiarism Check for PhD & M Pharm thesis  | Chairman-TMP<br>Member Secretary: BRP<br>Member-VJ                          | During the submission of thesis by the students   |
| 20. | Pharmacy Education Unit – for CCLPE activities  | MSS   | At least 5 activities/ year   |
| 21. | Annual result analysis and List of merit students   | Class teachers and M Pharm Course Coordinators                              | Soon after the exam results   |
| 22. | GPAT and other competitive exams (TOEFL, GRE etc.)  | Coordinator: SNM<br>Members: RAO, RJ  | Planning of coaching Throughout the academic year   |
| 23. | Library orientation   | Librarian   | July/August 2023  |
| 24. | Library staff coordinator   | Coordinator: HYK<br>Members: PP, AAR, RG, DT, and AAP                       | Two meetings/year<br>Yearly textbook requirements   |
| 25. | Soft Skills Training  | Coordinator: ABP<br>Member: MGS   | At least 3 activities/year  |
| 26. | International Student Rotation  | CSH   | As and when   |
| 27. | Hackathon   | RAO   | At least two events/ year   |

|     |   |   |  |
|-----|---|---|--|
| 28. | Golden Jubilee-Souvenir, press and publicity  | Chairman- TMP/ GVP<br>Members-BS, KSN,<br>RJ, RG, CIA | August 2022- August 2023   |
| 29. | SDG- Activities and Compendium  | CIA, PP   | <ul style="list-style-type: none"> <li>• Compendium- August 23</li> <li>• Regular activity under each SDG</li> </ul>                         |
| 30. | Course handouts/ Teachers' diary/<br>Student Handbook/Faculty Handbook.                                   | NPK & HYK   | <ul style="list-style-type: none"> <li>• July/ August 2023</li> </ul>  |
| 31. | National Pharmacy Week (NPW) &<br>Pharmacists Day   | Coordinator: UM & IPA<br>office bearers               | <ul style="list-style-type: none"> <li>• Nov-Dec 2023</li> </ul>   |
| 32. | Alumni association  | Coordinator: HVG<br>Member: SM                        | <ul style="list-style-type: none"> <li>• August/September 2023</li> </ul>  |
| 33. | Herbal and College Garden   | NPK   | <ul style="list-style-type: none"> <li>• Regular monitoring</li> </ul>   |
| 34. | ISO 9001:2015   | Coordinator:<br>SNM<br>Member: SM                     | <ul style="list-style-type: none"> <li>• 2 Internal audits (July and December)</li> <li>• Surveillance/<br/>Recertification audit</li> </ul> |
| 35. | Press and publicity   | Coordinator: BRP<br>Member: TS                        | During the Conferences/<br>workshop organized  |
| 36. | Foreign students' cell  | MPV   | At least 2 meetings  |
| 37. | Monthly/Annual report of college and<br>JSSU Newsletter & Annual report of<br>JSS AHER and other agencies | Coordinator: KM<br>Members: PP, HP,<br>AAP, DT, AAR   | Monthly report   |
| 38. | College website updating  | Coordinator: HKS<br>Members: AKT, DT,<br>RG, URR, MGS | Throughout the year  |
| 39. | JSSUonline.com<br>Student promotion, Timetable, teacher<br>allotment, and others                          | Coordinator - SRD                                     | Throughout the year  |
| 40. | Annual group photo session  | HP, RG  | Feb 2024   |
| 41. | Lab coat and Blazers  | JS and Ningaraju                                      | August/Sep 2023  |
| 42. | Notice Board (SNB, LNB, and IIPC),<br>Departmental staff list   | Shadakshari   | Throughout the year  |
| 43. | Stock verification  | Ningaraju   | April/May 2024   |
| 44. | Student Liaison   | Coordinator: AAO<br>Member: TS                        | Throughout the year  |
| 45. | Student ID Cards /Attendance entry  | Shivanna & Kumar                                      | Aug/Sep 2023   |
| 46. | Retreat for Pharmacy Students   | AKT   | Nov/Dec 2023   |
| 47. | Retreat for Teachers  | JS  | November 2023/May 2024   |

| 48.                               | Feedback  | VJ & SA  | April/May 2023                         |
|-----------------------------------|---|--|--|
| 49.                               | Institute Innovation Cell   | Coordinator: RAO<br>Member: DT                 | Throughout the year                    |
| 50.                               | Practice School   | Coordinator: ST<br>Member: KSN, PS,<br>MSS, PP | Throughout the year                    |
| 51.                               | MOUs-Collate College initiation activities  | HP   | June 2023 & Jan 2024                   |
| <b>Extracurricular activities</b> |   |  |  |
| Sl. No.                           | Activities  | Coordinator/s                                  | Tentative schedule of meeting/activity |
| 52.                               | Selection of Class Representatives, Pharmaceutical society members<br>Annual planning and execution of Student-centered and professional activities including the inauguration of IPS | Coordinator: MPV<br>Member: MSS                | July 2023                              |
| 53.                               | JASPHARM- College magazine  | Coordinator: BS<br>Member: AAP                 | July 2024                              |
| 54.                               | STUMAG- College wall magazine   | TSK, LR  | At least 3 issues/year                 |
| 55.                               | Sports coordinators   | HYK, SND                                       | Feb 2024                               |
| 56.                               | NSS coordinators  | Program Officer- URR<br>Assistant PO - SND     | Regular activities and special camp    |
| 57.                               | Cultural & Literary coordinators  | PS, MGS, LR                                    | Nov 2023                               |
| 58.                               | Annual Day Celebration & Graduation Day   | CIA, ASP                                       | March 2024, July 2024                  |
| 59.                               | Foreign languages   | CIA, PP  | Throughout the year                    |
| 60.                               | College Calendar & Events   | RSC, MPV                                       | June / July 2023                       |

### Program Committee

| <b>Program Committee</b> |                         |             |                    |
|--------------------------|-------------------------|-------------|--------------------|
| Sl. No.                  | Program committees      | Chairperson | Member Secretary   |
| 61.                      | D. Pharm                | GVP         | MSS                |
| 62.                      | B. Pharm                | GVP         | MPV                |
| 63.                      | Pharm. D                | TMP         | CSH                |
| 64.                      | M. Pharm                | TMP         | RSC                |
| 65.                      | Diploma programs        | GVP         | RJ                 |
| Sl. No.                  | <b>M. Pharm Program</b> |             | <b>Coordinator</b> |

|                |   |                    |
|----------------|---|--------------------|
| 66.            | Pharmaceutics                                   | RAO                |
| 67.            | Industrial Pharmacy                             | ASP                |
| 68.            | Pharmaceutical Regulatory Affairs               | MPV                |
| 69.            | Pharmaceutical Quality Assurance                | HKS                |
| 70.            | Pharmaceutical Chemistry                        | HYK                |
| 71.            | Pharmaceutical Analysis                         | AKT                |
| 72.            | Pharmacology                                    | SM                 |
| 73.            | Pharmacognosy                                   | NPK                |
| 74.            | Pharmacy Practice                               | UM                 |
| 75.            | Pharmaceutical Biotechnology                    | RG                 |
| <b>Sl. No.</b> | <b>PG Diploma Program</b>                       | <b>Coordinator</b> |
| 76.            | Pharmacovigilance                               | CSH                |
| 77.            | Medicine & Poison Information                   | UM                 |
| 78.            | Clinical Research                               | SP                 |
| 79.            | Pharmaceutical Quality Assurance                | TS                 |
| 80.            | Pharmaceutical Regulatory Affairs               | MPV                |
| 81.            | Medical Devices                                 | MGS                |
| 82.            | Intellectual Property Rights                    | ARR/ HYK           |
| 83.            | Computer-Aided Drug Design                      | SD                 |
| 84.            | Food and Drug Analysis                          | RJ                 |
| 85.            | Regulatory Toxicology                           | SBC                |
| 86.            | Phytopharmaceutical and Industrial Applications | NPK                |
| 87.            | Quality control                                 | AKT                |
| <b>Sl. No.</b> | <b>Certificate Course</b>                       | <b>Coordinator</b> |
| 88.            | Pharmaceutical Quality Assurance                | HKS                |
| 89.            | Herbal Drug Standardization                     | HP                 |

|     |                           |     |
|-----|---------------------------|-----|
| 90. | Medicine Information      | BRJ |
| 91. | Clinical Research         | SP  |
| 92. | Global Regulatory Affairs | MPV |
| 93. | Food & Nutraceuticals     | RJ  |
| 94. | Telemedicine              | BRJ |

### 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. Gurubasavaraj V Pujar (GVP)           | M.Pharm., Ph.D. | Professor & Vice Principal | Pharma. Chemistry |
| 3.     | Dr. Balamuralidhara V. (BMV)              | M.Pharm., Ph.D. | Assoc. Professor & Head    | Pharmaceutics     |
| 4.     | Dr.K. Bangarurajan (KBR)                  | M.Pharm., Ph.D. | Professor                  | Pharmaceutics     |
| 5.     | Dr. Gangadharappa H.V. (HVG)              | M.Pharm., Ph.D. | Assoc. Professor           | Pharmaceutics     |
| 6.     | Dr. M.P. Venkatesh (MPV)                  | M.Pharm., Ph.D. | Assoc. Professor           | Pharmaceutics     |
| 7.     | Dr. Vikas Jain (VJ)                       | M.Pharm., Ph.D. | Assoc. Professor           | Pharmaceutics     |
| 8.     | Dr. Amit B Patil (ABP)                    | M.Pharm., Ph.D. | Assoc. Professor           | Pharmaceutics     |
| 9.     | Dr. Hemanth Kumar S (HKS)                 | M.Pharm., Ph.D. | Asst. Professor            | Pharmaceutics     |
| 10.    | Dr. Osmani Mir Riyaz Ali MahafezAli (RAO) | M.Pharm., Ph.D. | Asst. Professor            | Pharmaceutics     |
| 11.    | Dr. Asha Spandana K M (ASP)               | M.Pharm., Ph.D. | Lecturer                   | Pharmaceutics     |
| 12.    | Dr. Shailesh T(TS)                        | M.Pharm., Ph.D. | Lecturer                   | Pharmaceutics     |
| 13.    | Ms. Preethi S (PS)                        | M.Pharm         | Lecturer                   | Pharmaceutics     |
| 14.    | Mrs. Akhila AR (AAR)                      | M.Pharm         | Lecturer                   | Pharmaceutics     |
| 15.    | Mr. Trideva Sastri K (TSK)                | M.Pharm         | Lecturer                   | Pharmaceutics     |
| 16.    | Dr.Meghana G S(MGS)                       | M.Pharm., Ph.D. | Lecturer                   | Pharmaceutics     |
| 17.    | Dr. Savitha R S (RSS)                     | M.Pharm.        | Assoc. Professor & Head    | Pharmacy Practice |
| 18.    | Dr. M. Ramesh (MR)                        | M.Pharm., Ph.D. | Professor                  | Pharmacy Practice |
| 19.    | Ms. Shilpa Palaksha (SP)                  | M.Pharm.        | Assoc. Professor           | Pharmacy Practice |
| 20.    | Mr. D.H. P. Gowda (DHP)                   | M.Sc., PGDCA.   | Asst. Professor            | Pharmacy Practice |
| 21.    | Dr. M Umesh (UM)                          | Pharm D.        | Asst. Professor            | Pharmacy Practice |
| 22.    | Dr. Sri Harsha Chalasani (CSH)            | M.Pharm., Ph.D. | Asst. Professor            | Pharmacy Practice |
| 23.    | Dr. Jaidev Kumar B R (BRJ)                | M.Pharm.        | 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. Acsah Annie Paul (AAP)        | Pharm D         | Lecturer                | Pharmacy Practice            |
| 28. | Dr Siddartha N Durappanavar (SND) | Pharm D         | Resident                | Pharmacy Practice            |
| 29. | Dr. B.M. Gurupadayya (BMG)        | M.Pharm., Ph.D. | Professor & Head        | Pharma. Chemistry            |
| 30. | Dr. R. S. Chandan (RSC)           | M.Pharm., Ph.D. | Assoc. Professor        | Pharma. Chemistry            |
| 31. | Dr. Prashantha Kumar B R (BRP)    | M.Pharm., Ph.D. | Assoc. Professor        | Pharma. Chemistry            |
| 32. | Dr. Anand Kumar Tengli (AKT)      | M.Pharm., Ph.D. | Assoc. Professor        | Pharma. Chemistry            |
| 33. | Dr. H. Yogish Kumar (HYK)         | M.Pharm., Ph.D. | Lecturer                | Pharma. Chemistry            |
| 34. | Dr. Sheshagiri Dixit (SD)         | M.Pharm., Ph.D. | Lecturer                | Pharma. Chemistry            |
| 35. | Dr Rupshee Jain (RJ)              | M.Pharm., Ph.D. | Lecturer                | Pharma. Chemistry            |
| 36. | Mr. Chetan.IA(CIA)                | M.Pharm         | Lecturer                | Pharma. Chemistry            |
| 37. | Dr. Prabitha P (PP)               | M.Pharm., Ph.D. | Lecturer                | Pharma. Chemistry            |
| 38. | Dr. J. Suresh (JS)                | M.Pharm., Ph.D. | Professor & Head        | Pharmacognosy                |
| 39. | Dr. K Mruthunjaya (KM)            | M.Pharm., Ph.D. | Professor               | Pharmacognosy                |
| 40. | Dr. N Paramakrishnan (NPK)        | M.Pharm., Ph.D. | Asst. Professor         | Pharmacognosy                |
| 41. | Ms. Haripriya G (HG)              | M Pharm         | Lecturer                | Pharmacognosy                |
| 42. | Dr. Logesh R (LR)                 | M.Pharm., Ph.D. | Lecturer                | Pharmacognosy                |
| 43. | Mr. Rajaguru A (RG)               | M.Pharm         | Lecturer                | Pharmaceutical Biotechnology |
| 44. | Mr. Siva Armugam (SA)             | M.Pharm         | Lecturer                | Pharmaceutical Biotechnology |
| 45. | Dr. K L Krishna (KLK)             | M.Pharm., Ph.D. | Assoc. Professor & Head | Pharmacology                 |
| 46. | Dr. S. N. Manjula (SNM)           | M.Pharm., Ph.D. | Professor               | Pharmacology                 |
| 47. | Dr. Saravana Babu C (SB)          | M.Pharm., Ph.D. | Professor               | Pharmacology                 |
| 48. | Dr. Seema Mehdi (SM)              | M.Pharm., Ph.D. | Lecturer                | Pharmacology                 |
| 49. | Dr. Nagashree K S (KSN)           | M.Pharm., Ph.D. | Lecturer                | Pharmacology                 |
| 50. | Dr. Dithu Thekkekkara (DT)        | M.Pharm., Ph.D. | Lecturer                | Pharmacology                 |

## PHARM.D

### Program outcomes:

Outcome 1 - Development of patient centered knowledge and skills: The student should understand and possess the knowledge and skills required to demonstrate the ability to provide patient centered pharmaceutical care services.

Outcome 2 - Development of pharmaceutical care plan: The student should be able to formulate a pharmaceutical care plan by working in close relation with healthcare professionals, and patient/care taker in order to ensure the enhanced therapeutic outcome in the patient. Also, the pharmaceutical care plan includes maximization of therapeutic benefit by detecting, preventing and resolving drug related problems. The student should be able to recommend pharmaceutical care plan based on evidence, and follow-up and document the outcomes of the pharmaceutical care service.

Outcome 3 – Hospital and community pharmacy management: The student should be able to accurately interpret prescriptions, dispense medications and manage drug distribution system adhering to patient needs, in compliance with policies and guidelines of the hospital pharmacy, good community pharmacy practice and the recommendations of regulatory agencies. Also able to prepare inventory, procure, and use appropriate methods of drug storage and adopt appropriate techniques of drug distribution to ensure correct dispensing of medicines.

Outcome 4 – Promote public healthcare program: The student should be able to participate in various public health care programs of the nation including disease prevention initiatives to improve public health. Contribute to the development and promotion of national health policies including rational drug use program and essential drug policy.

Outcome 5 – Ethics and professional integrity: The student should deliver the duties in accordance with legal, ethical, social, economic, and professional guidelines with integrity. Able to provide patient care services by making rational and ethical decisions that represent the best interest of the patient and the society, and respect the patient, healthcare professionals, and the privacy and confidentiality of health information.

Outcome 6 - Analytical, critical and decision making skills: The student should be able to retrieve, understand, interpret, apply, analyze, synthesize, and evaluate information. Able to apply critical thinking and interpretational skills to identify, manage, and prevent problems and make appropriate decisions.

Outcome 7 - Communication skills: The student should be able to communicate effectively with patients/caretakers, healthcare professionals. Able to effectively counsel, provide medicines information, and educate patients, caretakers & healthcare professionals about medication therapy and other health related issues. Effective communication includes use of both oral and written communications skills and various communication techniques.

Outcome 8 - Leadership and entrepreneurship skills: The student should be able to achieve leadership skills through team work and by involving in organizing various community outreach programs with sound decision making skills. Also the student should enhance the entrepreneurial skills by finding or creating new prospects in challenging professional environments.

Outcome 9 - Interprofessional collaborative practice: Student should be able to identify unique opportunities for professional collaboration towards patient-centered pharmaceutical care services and demonstrate the ability to interact and work with multidisciplinary healthcare teams.

Outcome 10 - Design and conduct of need based research: The student should be able to understand the research needs of the region/nation, and design and conduct the research

that would add value to the healthcare requirements of the patients and community/society.

**Outcome 11 - Digital literacy:** Students should be able to use computers and gadgets to search, retrieve, analyze, store, create, present and exchange information, and interact and participate in interactive networks through the Internet or through any other digital platform to enrich pharmaceutical care services.

**Outcome 12 - Life-long learning:** The student should be able to recognize knowledge and skill deficits that exist in the effective delivery of health care needs of the patient/society. As a life-long learner, student should be able to identify and analyze issues emerging in the advancing healthcare delivery, and set learning goals, locate, interpret appropriate resources, and assess progress toward meeting learning goals.

## COURSE HAND OUT 2023-24

**Class: I Pharm. D**

### I Course Details

| S. No. | Name of Subject                    | No. of hours of Theory   | No. of hours of Practical | No. of hours of Tutorial                 |
|--------|------------------------------------|--------------------------|---------------------------|--|
| 1.1    | Human Anatomy and Physiology       | 3                        | 3                         | 1  |
| 1.2    | Pharmaceutics                      | 2                        | 3                         | 1  |
| 1.3    | Medicinal Biochemistry             | 3                        | 3                         | 1  |
| 1.4    | Pharmaceutical Organic Chemistry   | 3                        | 3                         | 1  |
| 1.5    | Pharmaceutical Inorganic Chemistry | 2                        | 3                         | 1  |
| 1.6    | Remedial Mathematics/ Biology      | 3                        | 3*                        | 1  |
|        | <b>Total hours</b>                 | <b>13/16<sup>+</sup></b> | <b>15/18*</b>             | <b>5/6**<br/>= 33/37<sup>+</sup>/40*</b> |

+ For Mathematics (PCB students)

\* For Biology (PCM students)

### 2. Evaluation:

**Theory:** Internal assessment Marks: 30. Three periodic Internal assessment will be conducted in theory for 30 marks (*duration 1.5 Hour*) and average of best two will be considered for evaluation.

In Mathematics or Biology and Computer Science & Statistics, college will conduct final examination. You must score a minimum of 40% in these subjects to become eligible to write university examination.

**Practical:** Internal assessment Marks: 30. Three periodic Internal assessment will be conducted in practical for 20 marks and average of best two will be considered for evaluation, plus 10 marks are awarded for regularity, promptness, viva-voce and record maintenance.

JSS University will conduct annual examination for 70 marks in theory & practical at end of the academic session.

Classes will be awarded on the basis of total (sessional and annual examination) marks secured.

| <b>Class</b> | <b>Marks</b>                                 |
|--------------|--|
| Distinction  | 75% and above                                |
| First class  | 60% and above and less than 75%              |
| Second class | 50% and above and less than 60%              |
| Pass class   | Passed examination in more than one attempt. |

- 3 Sessional examination schedule:** I, II and III sessional dates will be announced separately.
- 4 Attendance:** Minimum of 80% attendance is necessary to appear for both Sessional and Annual examination.
- 5 Chamber consultation hours:** Any time during college hours.
- 6 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.

## 1.1 HUMAN ANATOMY & PHYSIOLOGY (THEORY)

**Theory: 3 Hrs. /Week**

**Responsible member/s of the academic staff: Ms. Seema Mehdi (SM)**

**Scope and Objectives:** This course is designed to impart a fundamental knowledge on the structure and functions of the human body. It also helps in understanding both homeostasis mechanisms and homeostatic imbalances of various body systems. Since a medicament, which is produced by pharmacist, is used to correct the deviations in human body, it enhances the understanding of how the drugs act on the various body systems in correcting the disease state of the organs.

**Course outcomes:**

1. Define the basic concepts and terminologies of Human Anatomy & Physiology.
2. Identify and understand the various tissues and organs associated with the different organ systems with help of charts, models and specimens.
3. The coordination in the functioning of different organs of each system.
4. Understand the several physiological homeostatic mechanisms and their imbalances in the human body
5. Learn the interlinked mechanisms in the maintenance of normal and physical exercise conditions
6. Learn and performed the hematological tests parameters, blood pressure recording, heart rate, pulse and respiratory volumes.

**Teaching/learning methodologies used:**

1. Lecture
2. Practical/Lab

**Course materials:**

### TEXT BOOKS

- a) Gerard J. Tortora and Bryan Derrickson. Principles of anatomy and physiology, Publisher Harpercollins College New York.
- b) Anne Waught & Allison Grant. Ross and Wilson's foundations of Anatomy and Physiology in Health and Illness. Publisher: Churchill Livingstone, Edinburg.

### REFERENCE BOOKS

- a) Guyton arthur, C. *Physiology of human body*. Publisher: Holtsaunders.
- b) Chatterjee, C.C. *Human physiology*. Volume 1&11. Publisher: medical allied agency, Calcutta.

- c) Peter L. Williams, Roger Warwick, Mary Dyson and Lawrence, H. *Gray's anatomy*. Publisher: Churchill Livingstone, London.
- d) K. Sembulingam & Prema Sembulingam, *Medical Physiology*, 4<sup>th</sup> Edition. Publisher: Jaypee Brothers.

**Lecture wise program:**

| <b>No.</b> | <b>Topics</b>  | <b>Hrs</b> |
|------------|--|------------|
| 1.         | Scope of anatomy and physiology, basic terminologies used in this subject.<br>(Description of the body as such planes and terminologies)   | <b>01</b>  |
| 2.         | General Physiology: Structure of cell – its components and their functions.<br>Homeostasis, Mechanism of transport across cell membrane, Secondary messengers and Ion channels   | <b>04</b>  |
| 3.         | Elementary tissues of the human body: epithelial, connective, muscular and nervous tissues-their sub-types and characteristics.  | <b>04</b>  |
| 4.         | a) Osseous system - structure, composition and functions of the skeleton.<br>(done in practical classes - 6hrs)<br>b) Classification of joints, types of movements of joints and disorders of joints.<br>(Definitions only)  | <b>01</b>  |
| 5.         | <u>Haemopoetic system</u><br>a) Composition and functions of blood<br>b) Haemopoiesis and disorders of blood components. (Definition only)<br>c) Blood groups<br>d) Clotting factors and mechanism<br>e) Platelets and disorders of coagulation  | <b>05</b>  |
| 6.         | <u>Lymph</u><br>a) Lymph and lymphatic system, composition, formation and circulation.<br>b) Spleen: structure and functions, disorders<br>c) Disorders of lymphatic system (Definition only)  | <b>04</b>  |
| 7.         | <u>Cardiovascular system</u><br>a) Anatomy and functions of heart<br>b) Blood vessels and circulation (Pulmonary, coronary and systemic circulation)<br>c) Electrocardiogram (ECG)<br>d) Cardiac cycle and heart sounds<br>e) Blood pressure – its maintenance and regulation<br>f) Definition of the following disorders<br>Hypertension, hypotension, arteriosclerosis, atherosclerosis, angina, myocardial infarction, congestive heart failure and cardiac arrhythmias | <b>06</b>  |

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- |     |   |           |
|-----|---|-----------|
| 8.  | <u>Respiratory system</u>   | <b>05</b> |
|     | a) Anatomy of respiratory organs and functions  |           |
|     | b) Mechanism / physiology of respiration and regulation of respiration  |           |
|     | c) Transport of respiratory gases   |           |
|     | d) Respiratory volumes and capacities, and definition of: hypoxia, asphyxia, oxygen therapy and resuscitation |           |
| 9.  | <u>Digestive system</u>   | <b>06</b> |
|     | a) Anatomy and physiology of GIT  |           |
|     | b) Anatomy and functions of accessory glands of GIT   |           |
|     | c) Digestion and absorption   |           |
|     | d) Disorders of GIT (Definitions only)  |           |
| 10. | <u>Nervous system</u>   | <b>08</b> |
|     | a) Definition and classification of nervous system.   |           |
|     | b) Synapse and neurotransmitter, meninges, ventricles of the brain and CSF                                    |           |
|     | b) Anatomy, physiology and functional areas of cerebrum   |           |
|     | c) Anatomy and physiology of cerebellum   |           |
|     | d) Anatomy and physiology of mid brain  |           |
|     | e) Thalamus, hypothalamus and basal ganglia   |           |
|     | f) Spinal cord: Structure & reflexes – mono-poly-planter  |           |
|     | g) Cranial nerves – names and functions   |           |
|     | h) ANS – Anatomy & functions of sympathetic & parasympathetic nervous system                                  |           |
| 11. | <u>Urinary system</u>   | <b>05</b> |
|     | a) Anatomy and physiology of urinary system   |           |
|     | b) Formation of urine   |           |
|     | c) Renin angiotensin aldosterone system – Juxtaglomerular apparatus - acid base balance                       |           |
|     | d) Clearance tests and micturition  |           |
| 12. | <u>Endocrine system</u>   | <b>06</b> |
|     | a) Pituitary gland  |           |
|     | b) Adrenal gland  |           |
|     | c) Thyroid and Parathyroid glands   |           |
|     | d) Pancreas and gonads  |           |
| 13. | <u>Reproductive system</u>  | <b>07</b> |
|     | a) Male and female reproductive system organs anatomy and physiology  |           |
|     | b) Their hormones – physiology of menstruation  |           |
|     | c) Spermatogenesis & Oogenesis  |           |
|     | d) Sex determination (genetic basis)  |           |
|     | e) Pregnancy, maintenance and Parturition   |           |
|     | f) Contraceptive devices  |           |

14. Sense organs **06**  
a) Eye  
b) Ear  
c) Skin  
d) Tongue & Nose
15. Skeletal muscles **03**  
a) Histology  
b) Physiology of Muscle contraction  
c) Physiological properties of skeletal muscle and their disorders (Definitions only)
16. Sports physiology **03**  
a) Muscles in exercise, Effect of athletic training on muscles and muscle performance  
b) Respiration in exercise, CVS in exercise, body heat in exercise, body fluids and salts in exercise  
c) Drugs and athletics

**Theory Sessional Examination Syllabus**

| Sessional No. | Syllabus     |
|---------------|--------------|
|               | Chapters no. |
| I             | 1-7          |
| II            | 8-11         |
| III           | 12-16        |



## 1.1 HUMAN ANATOMY & PHYSIOLOGY (PRACTICALS)

**Practical: 75 hrs (3 Hrs/Week)**

**Responsible member/s of the academic staff: Ms. Seema Mehdi (SM)**

**General Requirements:** Laboratory napkin, muslin cloth, record, observation book (100pages), stationary items, and blood lancet.

### Course outcomes:

1. Examine and correlate hematological parameters with clinical conditions in relevance to health care.
2. Identify the different bones, various models/specimen/slides of human organs and tissues.
3. Demonstrate the measurement of blood pressure.
4. Demonstrate senses, nervous system and endocrine system using models
5. Demonstrate digestive, respiratory, cardiovascular systems, urinary and reproductive systems with the help of models and specimens.
6. Understand pregnancy diagnosis tests and different family Planning appliances.

### List of Experiments:

1. Study of compound microscope.
2. Study of tissues of human body.
  - (a) Epithelial tissue.
  - (b) Muscular tissue.
3. Study of tissues of human body.
  - (a) Connective tissue.
  - (b) Nervous tissue.
4. Study of appliances used in haematological experiments.
5. Determination of total WBC count of blood.
6. Determination of total RBC count of blood.
7. Determination of differential leukocyte count of blood.
8. Determination of
  - (a) Erythrocyte Sedimentation Rate. (ESR)
  - (b) Hemoglobin content of blood.
  - (c) Bleeding time & clotting time.
8. Determination of
  - (a) Blood pressure. (b) Blood group.
9. Study of various systems with the help of charts, models & specimens
  - (a) Skeleton system part I-axial skeleton. (b) Skeleton system part II- appendicular skeleton.
  - (c) Cardiovascular system. (d) Respiratory system.
  - (e) Digestive system. (f) Urinary system.
  - (g) Nervous system. (h) Special senses.
  - (i) Reproductive system.
10. Study of different family planning appliances.
11. Study of pregnancy diagnosis test.

12. Study of appliances used in experimental physiology.
13. Study of record of simple muscle curve using gastrocnemius sciatic nerve preparation.
14. Study of simple summation curve using gastrocnemius sciatic nerve preparation.
15. Study of simple effect of temperature using gastrocnemius sciatic nerve preparation.
16. Study of simple effect of load & after load using gastrocnemius sciatic nerve preparation.
17. Study of fatigue curve using gastrocnemius sciatic nerve preparation.

### Scheme of Practical Examination

|                  | <b>Sessionals</b> | <b>Annual</b> |
|------------------|-------------------|---------------|
| Identification   | 04                | 10            |
| Synopsis         | 04                | 10            |
| Major Experiment | 07                | 20            |
| Minor Experiment | 03                | 15            |
| Viva             | 02                | 15            |
| <b>Max Marks</b> | <b>20</b>         | <b>70</b>     |
| <b>Duration</b>  | <b>03 hrs</b>     | <b>04 hrs</b> |

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).

## 1.2 PHARMACEUTICS (THEORY)

**Theory: 2 Hrs. /Week**

**Responsible member/s of the academic staff: Mr. Trideva Sastri K (TSK)**

**Scope and objectives:** This course is designed to impart a fundamental knowledge on the art and science of formulating different dosage forms. It prepares the students for most basics of the applied field of pharmacy.

### Course Outcomes:

1. Identify the formulation aspects involved in the different dosage forms.
2. Determine the different calculations involved in the calculation of child dose from adult dose
3. Demonstrate the formulation of different types of dosage forms.
4. Demonstrate on the different extraction process
5. Demonstrate the preparation of surgical aids and their uses
6. Determine the different incompatibilities and the process to avoid them.

### Teaching/learning methodologies used:

1. Lecture
2. Practical/Lab
3. Discussion

### Course materials:

#### TEXT BOOKS

- a. Cooper and Gunns Dispensing for pharmacy students.
- b. A text book Professional Pharmacy by N.K.Jain and S.N.Sharma.

#### REFERENCE BOOKS

- a. Introduction to Pharmaceutical dosage forms by Howard C. Ansel.
- b. Remington's Pharmaceutical Sciences.
- c. Register of General Pharmacy by Cooper and Gunn.
- d. General Pharmacy by M.L.Schroff.

### Lecture wise programme:

| Topics   | Hrs       |
|--|-----------|
| 1. a. Introduction to dosage forms - classification and definitions  | <b>06</b> |
| b. Prescription: definition, parts and handling  |           |
| c. Posology: Definition, Factors affecting dose selection. Calculation of children and infant doses.                 |           |
| 2. History of profession of Pharmacy in India in relation to pharmacy education, industry and organization in brief. | <b>03</b> |
| 3. Development of Indian Pharmacopoeia. Salient features of latest edition of IP (IP                                 | <b>03</b> |

2008) and introduction to other Pharmacopoeias such as BP, USP, European Pharmacopoeia, Extra pharmacopoeia and Indian National formulary.

4. Weights and measures, Calculations involving percentage solutions, allegation, proof spirit, isotonic solutions. **06**
5. Powders and Granules: Classification advantages and disadvantages, Preparation of simple, compound powders, Insufflations, Dusting powders, Eutectic and Explosive powders, Tooth powder and effervescent powders and granules. **05**
6. Monophasic Dosage forms: Theoretical aspects of formulation including adjuvant like Vehicles, Organoleptic additives and Stabilizers, with examples. Study of Monophasic liquids (formulation aspects and examples) like gargles, mouth washes, Throat paint, Ear drops, Nasal drops, Liniments and lotions, Enemas and collodions. **06**
7. Biphasic dosage forms: Suspensions and emulsions, Definition, advantages and disadvantages, classification and formulation of Suspensions and Emulsions. Test for the type of emulsion and stability problems in emulsions. **06**
8. Suppositories: Definition, advantages and disadvantages, types of base, method of preparation, Displacement value and evaluation. **03**
9. Galenicals: Definition, of different extraction processes like infusion, Decoction, Maceration and Percolation. Study of Maceration and Percolation processes **06**
10. Surgical aids: Surgical dressings, sutures, ligatures and preparation of surgical catgut. **04**
11. Incompatibilities: Introduction, classification, Examples and methods to overcome Physical and therapeutic incompatibilities. **02**

#### Theory Sessional examination syllabus

| Sessional No. | Syllabus     |
|---------------|--------------|
|               | Chapters no. |
| I             | 1 to 4       |
| II            | 5 to 7       |
| III           | 8 to 11      |

## 1.2 PHARMACEUTICS (PRACTICALS)

**Practical: 75 Hours (3 hrs/week)**

**Responsible member/s of the academic staff: Mr. Trideva Sastri K (TSK)**

### Course Outcomes:

1. Identify the basics and types involved in a dosage form.
2. Define the formulation aspects involved in different dosage forms.
3. Understand the principle involved developing a dosage form.
4. Determine the storage requirements for a dosage form.
5. Demonstrate the applications of a dosage form.
6. Determine the labeling and packing required for a dosage form.

### List of Experiments:

- 1. Syrups**
  - a. Simple Syrup I.P
  - b. Syrup of Ephedrine Hydrochloride NF
  - c. Orange Syrup
- 2. Elixir**
  - a. Piperazine citrate elixir BP
  - b. Paracetamol elixir BPC
- 3. Linctus**
  - a. Simple linctus BPC
  - b. Pediatric simple linctus BPC
- 4. Solutions**
  - a. Solution of cresol with soap IP
  - b. Aqueous Iodine Solution IP
  - d. Strong solution of Iodine IP
  - e. Strong solution of ammonium acetate IP
- 5. Liniments**
  - a. Liniment of turpentine IP\*
  - b. Liniment of camphor IP
- 6. Suspensions\***
  - a. Calamine lotion
  - b. Magnesium Hydroxide mixture BP
- 7. Emulsions\***
  - a. Cod liver oil emulsion
  - b. Liquid paraffin emulsion
- 8. Powders\***
  - a. Eutectic powder
  - b. Dusting powder
  - d. Insufflations
- 9. Suppositories\***
  - a. Boric acid suppositories
  - b. Chloral suppositories
- 10. Incompatibilities**

## a. Preparations having with Physical Incompatibilities (3 Nos)

\* colourless bottles required for dispensing \* Paper envelope (white), butter paper and white paper required for dispensing.

**Scheme of Practical Examination**

|                  | <b>Sessionals</b> | <b>Annual</b> |
|------------------|-------------------|---------------|
| Synopsis         | 05                | 15            |
| Major Experiment | 10                | 25            |
| Minor Experiment | 03                | 15            |
| Viva             | 02                | 15            |
| <b>Max Marks</b> | <b>20</b>         | <b>70</b>     |
| <b>Duration</b>  | <b>03 hrs</b>     | <b>04 hrs</b> |

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).

## 1.3 MEDICINAL BIOCHEMISTRY (THEORY)

**Theory: 3 Hrs/Week**

**Responsible member/s of the academic staff: Dr. Chetan I A & Dr. G.V. Pujar (GVP)**

**Scope and Objectives:** Biochemistry deals with complete understanding of the molecular level of the chemical process associated with living cells in normal and abnormal state. It is also emphasize on chemical aspects of human life in health & illness and the application of chemical laboratory methods in the diagnosis, control of treatment and prevention of diseases. The objectives of the present course are providing biochemical facts and the principles to the students.

**Course Outcomes:**

1. Explain the importance of biochemistry in the pharmacy
2. Describe the catalytic role, therapeutic & diagnostic applications of enzymes and diagnosis of diseases
3. Summarize the metabolism of carbohydrates, proteins, lipids, regulatory pathways and deficiency & metabolic disorders
4. Describe structure of DNA, replication, transcription and translation and nucleotide repair mechanisms.
5. Explain the significance of organ function tests and lipid profile tests
6. Acquire knowledge on the biochemical significance of immunochemical techniques
7. Create awareness of different lifestyle diseases increasingly found in present day
8. Diagnosis of clinical disorders by estimating biomarkers

**Teaching/learning methodologies used:**

1. Lecture
2. Practical/Lab

**Course materials**

**TEXT BOOKS**

- a. Harpers review of biochemistry - Martin
- b. Text book of biochemistry – D.Satyanarayana
- c. Text book of clinical chemistry- Alex Kaplan &Laverve L.Szabo

**Reference books**

- a. Principles of biochemistry - Lehninger

- b. Text book of biochemistry - Ramarao
- c. Practical Biochemistry-David T.Plummer.
- d. Practical Biochemistry-Pattabhiraman.

**Lecture wise programme:**

| Topic  | Hrs       |
|--|-----------|
| <b>1. Introduction to biochemistry:</b> Cell and its biochemical organization, transport process across the cell membrane. Energy rich compounds: ATP, Cyclic AMP and their biological significance.   | <b>05</b> |
| <b>2. Enzymes:</b> Definition; Nomenclature; IUB classification; Factor affecting enzyme activity; Enzyme action; enzyme inhibition. Isoenzymes and their therapeutic and diagnostic applications; Coenzymes and their biochemical role and deficiency diseases.   | <b>10</b> |
| <b>3. Carbohydrate metabolism:</b> Glycolysis, citric acid cycle (TCA cycle), HMP shunt, Glycogenolysis, glycogenesis, gluconeogenesis. Metabolic disorders of Carbohydrate metabolism (diabetes mellitus and glycogen storage diseases); Glucose tolerance test and its significance; hormonal regulation of carbohydrate metabolism. | <b>11</b> |
| <b>4. Lipid metabolism:</b> - Oxidation of saturated fatty acid; Ketogenesis and ketolysis; biosynthesis of fatty acids and lipids; metabolism of cholesterol; Hormonal regulation of lipid metabolism. Defective metabolism of lipids (Atherosclerosis, fatty liver, hypercholesterolemia).   | <b>09</b> |
| <b>5. Biological oxidation:</b> Enzymes and Coenzyme system involved in Biological oxidation. Electron transport chain (its mechanism in energy capture, regulation and inhibition); Oxidative phosphorylation and uncouplers of ETC.  | <b>04</b> |
| <b>6. Protein and amino acid metabolism:</b> protein turn over; nitrogen balance; general reactions of catabolism of amino acids (Transamination, deamination & decarboxylation). Urea cycle and its metabolic disorders; production of bile pigments; hyperbilirubinemia, porphyrrias, jaundice. Metabolic disorder of Amino acids.   | <b>08</b> |
| <b>7. Nucleic acid metabolism:</b> Metabolism of purine and pyrimidine nucleotides; Protein, synthesis; Genetic code; inhibition of protein synthesis; DNA damage  | <b>12</b> |



and repair mechanism; DNA replication (semi conservative).

- 8. The kidney function tests:** Role of kidney; Laboratory tests for normal function includes- Urine analysis (macroscopic and physical examination, quantitative and semi quantitative tests.); Test for NPN constituents (Creatinine /urea clearance, determination of blood/ urine creatinine, urea and uric acid); Urine concentration test; Urinary tract calculi. (stones) **03**
- 9. Liver function tests:** Physiological role of liver, metabolic, storage, excretory, protective, circulatory functions and function in blood coagulation. Test for hepatic dysfunction-Bile pigments metabolism; Test for hepatic function test- Serum bilirubin, urine bilirubin, and urine urobilinogen; Dye tests of excretory function; Tests based upon abnormalities of serum proteins; Selected enzyme activity determination tests. **04**
- 10. Lipid profile tests:** Lipoproteins, composition, functions. Determination of serum lipids, total cholesterol, HDL cholesterol, LDL cholesterol and triglycerides. **02**
- 11. Immunochemical techniques** for determination of hormone levels and protein levels in serum for endocrine diseases and infectious diseases. Radio immuno assay (RIA) and Enzyme Linked Immuno Sorbent Assay (ELISA). **03**
- 12. Electrolytes:** Body water, compartments, water balance, and electrolyte distribution. Determination of sodium, calcium potassium, chlorides, bicarbonates in the body fluids **03**

#### Theory Sessional examination syllabus

| Sessional No. | Syllabus      |
|---------------|---------------|
|               | Chapters no.  |
| I             | 1 to 3        |
| II            | 4, 5, 6 and 8 |
| III           | 7, 9-12       |

### 1.3 MEDICINAL BIOCHEMISTRY (PRACTICALS)

**Practical: 75 Hours (3 hrs/ week)**

**Responsible member/s of the academic staff: Dr. Chetan I A**

**Course Outcomes:**

- 1) Explain the principle involved in the analysis of urine components, serum components and salivary amylase function
- 2) Perform the qualitative and analysis of urine to find out the constituents present and understand the clinical condition.
- 3) Estimate the urine components (sugar, chloride, calcium, creatinine) and give a remark on the clinical conditions
- 4) Quantify and report the significance of the amount of serum constituents such as sugar, creatinine, cholesterol
- 5) Basic preparation of buffers and the measure of buffer capacity
- 6) Perform the photometric analysis of important ions of electrolytes

**Title of the Experiment:**

- 1 Qualitative analysis of normal constituents of urine.
- 2 Qualitative analysis of abnormal constituents of urine.
- 3 Quantitative estimation of urine chlorides by Volhard's method.
- 4 Quantitative estimation of urine creatinine by Jaffe's method.
- 5 Quantitative estimation of urine calcium by precipitation method.
- 6 Quantitative estimation of serum cholesterol.
- 7 Preparation of Folin Wu filtrate from blood.
- 8 Quantitative estimation of blood creatinine.
- 9 Quantitative estimation of blood sugar Folin-Wu tube method.
- 10 Estimation of SGOT in serum.
- 11 Estimation of SGPT in serum.
- 12 Estimation of Urea in Serum.
- 13 Estimation of Proteins in Serum.
- 14 Determination of serum bilirubin
- 15 Determination of Glucose by means of Glucoseoxidase.
- 16 Enzymatic hydrolysis of Glycogen/Starch by Amylases.
- 17 Study of factors affecting Enzyme activity. (pH & Temp.)
- 18 Preparation of standard buffer solutions and its pH measurements (any two)
- 19 Experiment on lipid profile tests
- 20 Determination of sodium/calcium / potassium in serum.

**Scheme of Practical Examination:**

|                  | <b>Sessionals</b> | <b>Annual</b> |
|------------------|-------------------|---------------|
| Synopsis         | 05                | 15            |
| Major Experiment | 10                | 25            |
| Minor Experiment | 03                | 15            |
| Viva             | 02                | 15            |
| <b>Max Marks</b> | <b>20</b>         | <b>70</b>     |
| <b>Duration</b>  | <b>03 hrs</b>     | <b>04 hrs</b> |

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).

## 1.4 PHARMACEUTICAL ORGANIC CHEMISTRY (THEORY)

Responsible member of the academic staff: **Dr. Prashantha Kumar B R (BRP)**

**Theory: 3 Hrs/Week**

**Scope and objectives:** Imparts knowledge about IUPAC / Common systems of nomenclature, physical properties, mechanism and uses of different classes of organic compounds.

### Course Outcomes:

1. Naming simple organic compounds belonging to different classes as per IUPAC system and able to identify possible isomerism and stereochemistry.
2. Know about the Physical properties of organic compounds.
3. Write different preparation methods and chemical reactions of various classes of organic compounds.
4. Know about various reactions with mechanism, order of reactivity, stability of organic compounds synthesis of organic compounds.
5. Know about organic reactions with mechanisms
6. Know about Various medicinal uses of organic compounds in pharmacy

### Teaching/learning methodologies used:

1. Lecture
2. Practical/Lab

### Course materials:

#### TEXT BOOKS

- a. Organic chemistry- T.R.Morrison and R. Boyd
- b. Text book of Pharmaceutical chemistry - Bentley and Driver
- c. Organic chemistry, the fundamentals of chemistry - I.L.Finar
- d. Organic chemistry - P.L.Soni
- e. Text book of organic chemistry - B.S.Bahl and Arun Bahl

#### REFERENCE BOOKS

- a. Organic chemistry – J.M.Cram and D.J.Cram
- b. Organic chemistry- Brown
- c. Advanced organic chemistry- Jerry March, Wiley
- d. Organic chemistry- Cram and Hammered, Pine Hendrickson

### Lecture wise programme:

|   | Topic   | Hrs       |
|---|---|-----------|
| <b>1. Classification and Nomenclature</b> |   | <b>10</b> |
|   | Different types of classification of organic compounds  |           |
| i.  | Common- IUPAC systems of nomenclature of following classes of open chain compounds.<br>Hydrocarbons, halohydrocarbons, alcohols, aldehydes, ketones, carboxylic |           |

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|  |           |
|--|-----------|
| acids, carboxylic acid halides, carboxylic acid amides, carboxylic acid esters, acid anhydrides, amines, ethers  |           |
| ii. Nomenclature of alicyclic compounds and aromatic compounds (non heterocyclic)  |           |
| <b>2. Isomerism</b>  | <b>04</b> |
| a. Structural isomerism, chain isomerism, positional isomerism, functional isomerism, metamerism, tautomerism  |           |
| b. Stereo isomerism, optical isomerism, geometrical isomerism, specification of configuration, conformational isomerism  |           |
| <b>3. Structure and Properties</b>   | <b>05</b> |
| a Polar molecules, nonpolar molecules, protic molecules, aprotic molecules   |           |
| b Inter molecular forces   |           |
| c Melting point, boiling point of organic compounds, solubility of organic compounds   |           |
| <b>4. Alkanes</b>  | <b>03</b> |
| Free radical substitution reactions of alkanes- reactivity, inhibition. Reaction between methane, ethane, propane and halogens   |           |
| <b>5. Alkenes</b>  | <b>08</b> |
| a. i. Dehydrohalogenation reactions of alkyl halides- kinetics, rearrangement of carbo cations, reactivity, orientation  |           |
| ii. Dehydration of alcohols reactions- kinetics, rearrangement of carbo cations, reactivity, orientation   |           |
| iii. E <sub>1</sub> versus E <sub>2</sub> reactions  |           |
| b. Electrophilic addition reactions of alkenes- orientation, rearrangement of carbo cations, reactivity  |           |
| c. Free radical addition reactions of alkenes- orientation, reactivity   |           |
| <b>6. Alkyl halides</b>  | <b>03</b> |
| Preparation of alkyl halides from alcohols by Nucleophilic substitution reactions, Nucleophilic substitution reactions of alkyl halides- kinetics, reactivity, rearrangement of carbocations, solvent effect, stereochemistry. |           |
| SN <sup>1</sup> versus SN <sup>2</sup> reactions   |           |
| <b>7. Alicyclic compounds</b>  | <b>03</b> |
| a. Baeyer's strain theory, Sachse Mohr theory  |           |
| b. General methods of preparation  |           |
| <b>8. Dienes</b>   |           |
| Classification, stability, ease of formation of conjugated dienes, electrophilic and free radical addition reactions of conjugated dienes  | <b>03</b> |

|  |           |
|--|-----------|
| <b>9. Aromatic compounds</b>   | <b>08</b> |
| a) Evidences in the derivation of structure of Benzene, aromatic characters  |           |
| b) i. Electrophilic substitution reactions of Benzene- nitration, sulfonation, halogenations, reactivity of halogens, Friedel craft's alkylation, reactivity of alkyl halides and limitation of Friedel crafts alkylation reactions, Friedel crafts acylation reactions. |           |
| ii. Classification of substituents   |           |
| iii. Orientation of mono substituted Benzene compounds towards electrophilic substitution reactions.   |           |
| c). Nucleophilic aromatic substitution reactions- reactivity, comparison with aliphatic nucleophilic substitution reactions  |           |
| <b>10. Carbonyl compounds</b>  | <b>06</b> |
| a). Nucleophilic addition reactions, reactions between carbonyl compounds and hydrogen cyanide, Sodium bisulphite, hydroxyl amine, hydrazine, phenyl hydrazine, 2,4- dinitro phenyl hydrazine, alcohol   |           |
| b). Aldol, crossed aldol, Cannizaro, crossed Cannizaro, Benzoin, Perkin reactions  |           |
| <b>11. Carboxylic acids and derivatives</b>  | <b>05</b> |
| a). Acidity of carboxylic acids and effect of substituents on it.  |           |
| b). Nucleophilic acyl substitution reactions, esterification.  |           |
| c). Comparison of alkyl nucleophilic substitution with nucleophilic acyl substitution reactions  |           |
| <b>12. Amines</b>  | <b>03</b> |
| a. Basicity of amines  |           |
| b. Hoffmanns degradation of amides, diazotization reactions, coupling reactions, replacement reactions of aromatic diazonium salts   |           |
| <b>13. Phenols</b>   | <b>03</b> |
| a. Acidity of phenols  |           |
| b. Kolbe's synthesis, Riemer tiemann reactions, pthalein reaction, Schotten Bauman reaction, Libermann's nitrosation reaction  |           |
| <b>14. Heterocyclic compounds</b>  | <b>04</b> |
| Classification, nomenclature of mono and bicyclic compounds, medicinal uses of some important heterocyclic compounds   |           |
| <b>15. Carbohydrates</b>   | <b>03</b> |
| Classification, qualitative tests  |           |
| <b>16. Amino acids and proteins</b>  | <b>04</b> |
| a) Classification of amino acids, qualitative tests for amino acids  |           |
| b) Classification, structure, color reactions of proteins. Qualitative tests for proteins  |           |

#### Theory Sessional examination syllabus

| Sessional No. | Syllabus     |
|---------------|--------------|
|               | Chapters no. |
| I             | 1 to 5       |
| II            | 6 to 10      |
| III           | 11 to 16     |

## 1.4 PHARMACEUTICAL ORGANIC CHEMISTRY (PRACTICALS)

**Responsible member/s of the academic staff: Dr. B.R. Prashantha Kumar (BRP)**

**Practical: 75 Hours (3 hrs/ week)**

### Course Outcomes:

1. Understand Recrystallization of organic compounds
2. Identify different synthetic schemes and write mechanisms
3. Perform Lassigne's test with ease and safe
4. Perform solubility test to distinguish different classes of organic compounds
5. Perform qualitative analysis to identify organic compounds
6. Construct, demonstrate and understand the stereo models of organic compounds

### Title of the Experiment:

- 1 Recrystallisation of organic compounds
- 2 Preparation of simple non hetero cyclic organic compounds and recrystallisation of compounds prepared. (Minimum of 08 compounds)
  - Aspirin/Benzanilide/Phenyl benzoate/Acetanilide by acylation
  - 2,4,6-Tribromo aniline/Para bromo acetanilide by halogenation
  - 5-Nitro salicylic acid/ p-Nitroacetanilide/m-dinitro benzene by nitration
  - Dibenzal acetone from benzaldehyde by Claisen Schmidt
  - Benzoic acid from benzyl chloride by oxidation
  - Benzoic acid/Salicylic acid by hydrolysis
  - Phenyl azo -2- naphthol from aniline by diazotization and coupling
  - Benzophenone oxime from benzophenone
- 3 Systematic qualitative analysis of unknown organic compounds for preliminary and Lassaigns tests.
- 4 Systematic qualitative analysis of unknown organic compounds for functional groups (for preliminary / Lassaigns / solubility / functional group tests )  
Following classes of compounds may be analysed  
Phenols, amide/ urea, carbohydrate, amine, carboxylic acid, aldehyde, ketone, alcohol, carboxylic acid ester, hydrocarbon, halohydrocarbon, nitrocompound, anilide
- 5 Determination of melting and boiling points of organic compounds
- 6 Preparation of suitable solid derivatives from organic compounds
- 7 Introduction to the use of stereomodels – Methane, Ethane, Ethene, Acetylene, Cyclo hexane, Benzene (Students to prepare the ball and stick stereomodels using china clay, plastic sticks individually and to explain the formation of bonds & bond angles, bond lengths )

### Scheme of Practical Examination

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|                  | <b>Sessional</b> | <b>Annual</b> |
|------------------|------------------|---------------|
| Synopsis         | 04               | 15            |
| Major Experiment | 12               | 25            |
| Minor Experiment | -                | 15            |
| Viva             | 04               | 15            |
| <b>Max Marks</b> | <b>20</b>        | <b>70</b>     |
| <b>Duration</b>  | <b>03 hrs</b>    | <b>04 hrs</b> |

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).



## 1.5 PHARMACEUTICAL INORGANIC CHEMISTRY (THEORY)

**Theory: 2 Hrs / Week**

**Responsible member/s of the academic staff: Dr. B.M.Gurupadayya (BMG)**

**Scope and objectives:** This course mainly deals with fundamentals of analytical chemistry and also the study the Inorganic pharmaceuticals regarding their monographs and also the course deals with basic knowledge of analysis of various pharmaceuticals.

### **Course Outcomes:**

- 1) Identify different sources of errors & minimize errors with statistical knowledge
- 2) Estimate different types of volumetric analysis & titrations based on the nature of the pharmaceuticals
- 3) Identify the sources of impurities and analyze the impurities in inorganic pharmaceuticals
- 4) Describe the methods of preparation of inorganic pharmaceuticals
- 5) Explain the medicinal importance of acidifiers, antacids, cathartics and antimicrobial agents as gastrointestinal agents
- 6) Explain the medicinal importance of electrolytes and dental products in the available formulations
- 7) Describe the properties, storage condition and application of radiopharmaceuticals

### **Teaching/learning methodologies used:**

1. Lecture
2. Practical/Lab

### **Course materials:**

#### **TEXT BOOKS**

- a. A.H.Beckett & J.B. Stenlake's -Practical Pharmaceutical Chemistry Vol I & II, Stahl one Press of University of London, 4th edition.
- b. Text Book of Quantitative Inorganic analysis by Vogel
- c. Inorganic Pharmaceutical Chemistry III-Edition P. Gundu Rao

#### **REFERENCE BOOKS**

- a. A text book of Inorganic medicinal Chemistry by Surendra N. Pandey.
- b. Inorganic pharmaceutical Chemistry by M.L Schroff
- c. Bentley and Driver's Textbook of Pharmaceutical chemistry
- d. Pharmaceutical Analysis Vol – I, Dr. A.V. Kasture et al., Nirali Prakashan, 13th Edition.
- e. Inorganic Pharmaceutical Chemistry by Anand & Chetwal.
- f. Analytical chemistry principles by John H. Kennedy.
- g. I.P.1985,1996, 2008 Govt. of India, Ministry of Health

**Lecture wise programme:**

| <b>Topic</b>  | <b>Hrs</b> |
|---|------------|
| 1. Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figures.   | <b>02</b>  |
| 2. Fundamentals of volumetric analysis, theories of indicators and methods of expressing concentrations. Primary and secondary standard. Preparation and standardization of various volumetric solutions like oxalic acid, sodium hydroxide, hydrochloric acids, sodium thiosulphate, sulphuric acid, potassium permanganate, iodine and ceric ammonium sulphate solutions. | <b>04</b>  |
| <b>3. Acid base titration:</b> Classification and estimation of strong, weak, and very weak acids and bases.  | <b>02</b>  |
| <b>4. Principles of redox titrations:</b> Concepts of oxidation and reduction. Redox reactions, strength and equivalent weights of oxidizing and reducing agents, theory of redox titrations, cerimetry, Iodimetry, Iodometry, bromometry, titrations with potassium iodate, potassium bromate, titanous chloride, 2,6-dichlorophenol indophenol.                           | <b>03</b>  |
| <b>5. Non aqueous titration:</b> Introduction to solvents, classification and estimation of Sodium benzoate and ephedrine HCl.  | <b>02</b>  |
| <b>6. Principles of precipitation titrations:</b> Different methods-Mohr's, Modified Mohr's, Volhard's, Modified Volhard's, Fajans with example. Estimation of sodium chloride by modified volhards method.   | <b>03</b>  |
| <b>7. Complexometric titration and its classification:</b> Estimation of Magnesium sulphate, and Calcium Gluconate by complexometric method. Metal ion indicators.  | <b>03</b>  |
| <b>8. Gravimetry:</b> Introduction to gravimetric method, steps involved in gravimetric method, precipitants and estimation of Barium sulphate by gravimetric method.   | <b>02</b>  |
| <b>9. Limit test:</b> Source and effect of impurities in pharmacopoeial substances, importance of limit test, general principle and procedures for limit test, limit test for chloride, sulphate, iron, arsenic and lead and heavy metals. Special procedure for limit test for chloride and sulphate   | <b>06</b>  |
| <b>10. Medicinal gases:</b> Oxygen, Nitrous oxide, Carbon dioxide   | <b>01</b>  |
| <b>11. Acidifies:</b> Dil HCl, Ammonium Chloride*   | <b>01</b>  |
| <b>12. Antacid:</b> Aluminum hydroxide gel*, sodium bicarbonate*, Magnesium triisilicate, Magnesium carbonate (Light and Heavy), Magnesium hydroxide mixture*, Preparation containing combination of antacids.  | <b>03</b>  |
| <b>13. Cathartics:</b> Magnesium sulphate, Sodium orthophosphate  | <b>01</b>  |

- 14. Major extra and intracellular electrolytes:** Functions of major physiological ions, Electrolytes used in the replacement therapy: Sodium chloride\*, Sodium chloride Injection, Sodium chloride compound injection, Potassium chloride, Potassium chloride injection, Calcium Gluconate\* and Electrolyte combination therapy and ORS, Physiological acid base balance. **04**
- 15. Essential trace elements:** Copper, Iron, Iodine and Zinc **01**
- 16. Antimicrobials:** Potassium permanganate\*, Hydrogen peroxide\*, Chlorinated lime\*, Iodine and its preparations, Boric acid\*. **03**
- 17. Pharmaceutical aids:** Bentonite, sodium metabisulphite, Barium sulphate\* **01**
- 18. Dental products:** Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, Stannous fluoride, Zinc Eugenol cement. **02**
- 19. Miscellaneous compounds:** i) **Expectorants:** Potassium iodide\* ii) **Haematinics:** Ferrous sulphate\*, Ferrous gluconate, Ferrous fumarate, iii) **Emetics:** Copper sulphate\*, Sodium potassium tartarate iv) **Poison and Antidote:** Sodium thioisulphate, Activated charcoal, **04**
- 20. Radiopharmaceuticals:** Radio activity, natural radio activity and artificial radio activity. Measurement of radioactivity, Properties of  $\alpha$ ,  $\beta$ ,  $\gamma$  radiations, Half life, radio isotopes and study of radio isotopes sodium iodide I-121, Ferric citrate Fe-59. Storage conditions, precautions & pharmaceutical application of radioactive substances. **02**

#### Theory Sessional examination syllabus

| Sessional No. | Syllabus     |
|---------------|--------------|
|               | Chapters no. |
| I             | 1 to 6       |
| II            | 7 to 13      |
| III           | 14 to 20     |

## 1.5 PHARMACEUTICAL INORGANIC CHEMISTRY (PRACTICALS)

**Responsible member/s of the academic staff: Dr. B. M. Gurupadayya (BMG)**

**Practicals: 75 Hours (3 hrs /week)**

### Course Outcomes:

- 1) Familiarize with different classes of inorganic pharmaceuticals and acquire knowledge about the sources of impurities
- 2) Identify the sources of impurities and analyze them in the inorganic pharmaceuticals
- 3) Demonstrate on volumetric analytical methodologies
- 4) Identify/confirm the inorganic anions and cations in the pharmaceuticals.
- 5) Outline the general methods of preparation of inorganic compounds of pharmaceutical importance
- 6) Determine the quality control test of inorganic pharmaceutical compounds

### List of experiments:

1. Limit tests (7 exercises) \*
  1. Limit test for chlorides
  2. Limit test for sulphate
  3. Limit test for Iron
  4. Limit test for heavy metals
  5. Limit test for Arsenic
  6. Modifications in limit tests for chloride and sulphates in potassium permanganate, sodium bicarbonate, sodium benzoate and sodium Salicylate.
2. Preparation and standardization of the following (3 exercises)\*.
  1. 0.1N NaOH
  2. 0.1N KMnO<sub>4</sub>
  3. 0.1N Ceric ammonium sulphate
  4. 0.1N HClO<sub>4</sub>
  5. 0.05M Di sodium EDTA
  6. 0.1N Sodium thiosulphate
3. Assay of the following compounds \*\*
  1. Ammonium chloride-acid base titration (Formal titration)
  2. Ferrous sulphate- (redox) Ceric ammonium sulphate titration
  3. Copper sulphate- (redox) Iodometry
  4. Calcium gluconate-complexometry
  5. Hydrogen peroxide- (redox -Permanganometry)
  6. Sodium benzoate-nonaqueous titration
  7. Sodium chloride-Modified Volhard's method
  8. Assay of KI-KIO<sub>3</sub> titration

9. Assay of Zinc oxide (acid base back titration)
4. Test for identify for the following (2 exercises)\*
1. Sodium bicarbonate
  2. Ferrous sulphate
  3. Potassium iodide.
  4. Calcium chloride
5. Test for purity for the following (2 exercises)\*
1. Swelling power in Bentonite
  2. Ammonium salts in Potash alum.
  3. Presence of Iodates in KI
6. Preparation of inorganic pharmaceuticals (2 exercises)\*
1. Boric acid
  2. Potash alum
  3. Magnesium hydroxide.
  4. Magnesium sulphate

### Scheme of Practical Examination

| Scheme of Practical Examination                 | Sessional    | Annual       |
|---|--------------|--------------|
| Synopsis  | 05           | 15           |
| Major Experiment (Experiment indicated by**)    | 10           | 25           |
| Minor Experiment (Experiment indicated by*) 1&2 | 3            | 20           |
| Viva-Voce                                       | 2            | 10           |
| <b>Max. Marks</b>                               | <b>20</b>    | <b>70</b>    |
| <b>Duration</b>                                 | <b>3 Hrs</b> | <b>4 Hrs</b> |

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).

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## 1.6 REMEDIAL MATHEMATICS (THEORY)

**Theory: 3 hrs /week**

**Responsible Member of the academic staff: Mr. D.H. Panchaksharappa Gowda (DHP)**

**Scope and objectives:** This is an introductory course in mathematics. This subject deals with the introduction to matrices, determinants, trigonometry, analytical geometry, differential calculus, integral calculus, differential equations, laplace transform.

### **Course Outcomes:**

- 1) Apply mathematical concepts and principles to perform computations for Pharmaceutical Sciences.
- 2) Create, use and analyze mathematical representations and mathematical relationships.
- 3) Communicate mathematical knowledge and understanding to help in the field of Clinical Pharmacy
- 4) Adopt the conventional and creative techniques to solve the mathematical problems which are related to the field of Pharmacy.
- 5) To solve different types of problems by applying the mathematical reasoning.
- 6) Apply the techniques which involves approximation and simulation.

### **Teaching / learning methodologies used:**

1. Lecture
2. Discussion

### **Course materials:**

#### **TEXT BOOKS**

- a. Differential calculus By Shantinarayan
- b. Text book of Mathematics for second year pre-university by Prof.B.M.Sreenivas

#### **REFERENCE BOOKS**

- a. Integral calculus By Shanthinarayan
- b. Engineering mathematics By B.S.Grewal
- c. Trigonometry Part-I By S.L.Loncy

**Lecture wise programme:**

Note: To emphasis also on definition, examples and application in Pharmacy

|   | <b>Topic</b>   | <b>Hrs</b> |
|---|--|------------|
| 1 | <b>Algebra :</b> Matrices : Definition, Addition, Subtraction and Multiplication of matrices,<br>Determinants: Determinants of order two and three, Properties of determinants (without Proof). Inverse of square Matrices, Adjoint of square matrix, Solution of linear equation by Matrix method, Cramer's rule, Characteristic equation, Statement of Cayley-Hamilton Theorem (Without Proof) – Pharmaceutical examples   | <b>18</b>  |
| 2 | <b>Trigonometry :</b> Relation between Sides and angles of a triangle, solution of triangles – Simple problems   | <b>05</b>  |
| 3 | <b>Analytical Geometry :</b> Points, Straight line, Types of straight lines – $Y = mx + c$ , $(y - y_1) = m(x - x_1)$ , $(y - y_1) = ((y_2 - y_1)/(x_2 - x_1))(x - x_1)$ Parallel and Perpendicular straight lines, Angle between two lines, Perpendicular distance from a point to the line, distance between parallel lines,<br>Circle: General equation of circle, finding centre and radius of the circle,<br>Parabola: Equation of the parabola $y^2 = 4ax$ , Simple problems | <b>15</b>  |
| 4 | <b>Differential calculus:</b> Function, Limit, Differentiation, Differentiation of sum, Product, Quotient, Composite, Parametric, exponential, trigonometric and Logarithmic function. Successive differentiation, simple problems.  | <b>16</b>  |
| 5 | <b>Integral Calculus:</b> Partial fractions, Definition of integration, integration by substitution and integration by parts, Properties of definite integrals, Simple problems.   | <b>07</b>  |
| 6 | <b>Differential equations:</b> Definition, order, degree, variable separable, homogeneous differential equation, linear differential equation, exact differential equation, Simple problems  | <b>10</b>  |
| 7 | <b>Laplace transform:</b> Definition, Laplace transform of elementary functions, linearity and shifting property , simple problems   | <b>04</b>  |

**Theory Sessional examination syllabus**

| <b>Sessional No.</b> | <b>Syllabus</b>     |
|----------------------|---------------------|
|                      | <b>Chapters no.</b> |
| I                    | 3-4                 |
| II                   | 5, 6 and 7          |
| III                  | 1-2                 |

## 1.6 REMEDIAL BIOLOGY (THEORY)

**Theory: 75 Hours (3 Hrs /Week)**

**Responsible member of the academic staff: Mr. Rajaguru (RG)**

**Scope and Objectives:** This is an introductory course in Biology, which gives detailed study of natural sources such as plant and animal origin. This subject has been introduced to the pharmacy course in order to make the student aware of various naturally occurring drugs and its history, sources, classification, distribution and the characters of the plants and animals. This subject gives basic foundation to Pharmacognosy.

### **Course Outcomes:**

1. Explain about the kingdom living organisms and salient features
2. Explain the Cell - The unit of life and Tissues.
3. Explain about the morphology and general anatomy of the flowering plants
4. Describe the concepts of classification of plants and animals
5. Explain the plant tissues, respiration and photosynthesis
6. Describe the digestive, respiratory, excretory and reproductive systems of humans
7. Explain the Cell - The unit of life and Tissues.

### **Practical:**

1. Identify the plants and animals of medicinal interest.
2. Explain the principle involved in the plant physiology.
3. Explain the Anatomy and physiology of animals.
4. To appreciate general organization of mammals.

### **Teaching / Learning methodologies used:**

1. Lecture
2. Practical/ Lab
3. Discussion

### **Course Materials**

#### **TEXT BOOKS**

- a. Text book of Biology by S.B.Gokhale
- b. A Text book of Biology by Dr.Thulajappa and Dr. Seetaram.

#### **REFERENCE BOOKS**

- a. A Text book of Biology by B.V.Sreenivasa Naidu
- b. A Text book of Biology by Naidu and Murthy
- c. Botany for Degree students By A.C.Dutta.
- d. Outlines of Zoology by M.Ekambaranatha ayyer and T.N.Ananthakrishnan.
- e. A manual for pharmaceutical biology practical by S.B.Gokhale and C.K.Kokate.

### **Lecture wise programme:**



| <b>Topic</b>  | <b>75 Hrs</b> |
|---|---------------|
| <b>PART – A</b>   |               |
| 1.Introduction  | <b>06</b>     |
| General organization of plant cell and its inclusions   |               |
| 2.Plant tissues   | <b>04</b>     |
| 3.Plant kingdom   | <b>04</b>     |
| 4.Morphology of plant parts - Root, Stem, Leaf, Inflorescence, Flower and pollination, Fruits and seeds | <b>17</b>     |
| 5. Plant physiology   | <b>04</b>     |
| 6. Taxonomy of Leguminosae, umbelliferae, Solanaceae, Lilliaceae, Zinziberaceae, Rubiaceae              | <b>06</b>     |
| 1. Study of Fungi, Yeast, Penicillin and Bacteria   | <b>04</b>     |
| <b>PART-B</b>   |               |
| 8.Study of Animal kingdom, Study of animal cell and tissues   | <b>08</b>     |
| 9.Detailed study of frog  | <b>08</b>     |
| 10. Study of Pisces, Reptiles, Aves   | <b>05</b>     |
| 11. General organization of mammals   | <b>05</b>     |
| 12.Study of poisonous animals   | <b>04</b>     |

**Theory Sessional examination syllabus**

| Sessional No. | Syllabus       |
|---------------|----------------|
|               | Chapters no.   |
| I             | 1, 2 & 4       |
| II            | 3, 5, 6, 7 & 8 |
| III           | 9 to 12        |

## REMEDIAL BIOLOGY (PRACTICAL)

**Theory: 75 Hours (3 Hrs /Week)**

**Responsible member of the academic staff: Mr. Rajaguru (RG)**

**Course Outcomes:**

1. Determine the blood group
2. Determine the blood pressure and tidal volume
3. Prepare permanent slides
4. Perform microscopic study of leaf, stem and root
5. Identify the axial skeletal bones
6. Identify various tissues of the plant

**List of experiments:**

1. Introduction to biology experiments (section cutting techniques, Mounting and staining, slide preparation and Microscope)
2. Study of cell constituents and cell inclusions
3. Study of Stem modifications
4. Study of Root modifications
5. Study of Leaf modifications
6. Identification of Fruits and seeds
7. Preparation of Permanent slides
9. Simple plant physiological experiments
10. Identification of animals
11. Detailed study of Frog by using computer models
12. Computer based tutorials

**Scheme of Practical Examination**

|                  | <b>Sessionals</b> | <b>Annual</b> |
|------------------|-------------------|---------------|
| Identification   | 04                | 10            |
| Synopsis         | 04                | 10            |
| Major Experiment | 07                | 20            |
| Minor Experiment | 03                | 15            |
| Viva             | 02                | 15            |
| <b>Max Marks</b> | <b>20</b>         | <b>70</b>     |
| <b>Duration</b>  | <b>03 hrs</b>     | <b>04 hrs</b> |

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).

JSS Academy of Higher Education & Research  
**JSS College of Pharmacy**  
 Sri Shivarathreshwara Nagara, Mysore-570015  
**CLASS TIME TABLE- 2023-24**

Class: PHARM. D –FIRST YEAR

Lunch Break: 1.00 to 2.00 PM  
 Tea Break: 10.40 to 11.10 AM

| Time Day         | 9.00-9.50AM                    | 9.50-10.40AM                                   |  | 11.10-12.05PM  | 12.05-1.00PM   |  | 2.00-2.55PM                        | 2.55-3.50PM                     |  | 4.05-5.00PM                  | 5.00-5.55 PM                 |
|------------------|--------------------------------|--|--|--|--|--|------------------------------------|---------------------------------|--|------------------------------|------------------------------|
| <b>Monday</b>    | ← ----- Remedial Biology ----- |  | T<br>E<br>A<br><br>B<br>R<br>E<br>A<br>K | Practical --RG→  | Remedial Mathematics DHP   | L<br>U<br>N<br>C<br>H<br><br>B<br>R<br>E<br>A<br>K | ←BI ----- TS----Pharmaceutics ---- |                                 | T<br>E<br>A<br><br>B<br>R<br>E<br>A<br>K | -----→<br>Biochemistry-→     | -----                        |
| <b>Tuesday</b>   | Pharmaceutics (Tu) TMP         | ←---BI ----- SM<br>← B II - - RJ-              |  | Remedial Maths DHP   | Remedial Bio RG  |  | Pharm. Inorganic Chemistry BMG     | Pharm. Organic Chemistry BRP    |  | Human Anatomy &Physiology SM | Human Anatomy &Physiology SM |
| <b>Wednesday</b> | Pharmaceutics TS               | ←---BII --- TS<br>← BI - - - BRP-              |  | Human Anatomy &Physiology --→<br>Pharm. Inorganic Chemistry -→       | ----- Pharmaceutic--→<br>Pharm. Organic Chemistry --- -→             |  | Medicinal Biochemistry CIA         | Pharm Inorg Chem BMG            |  | Med Bio Chem CIA             | -----                        |
| <b>Thursday</b>  | Pharm. Org. Chem BRP           | ←BII ----- SM ---<br>← BI --BMG - -            |  | Human Anatomy &Physiology ----→<br>Pharm. Inorganic Chemistry -----→ | --- Medicinal Biochemistry----→<br>--- Pharm. Organic Chemistry ---→ |  | Communication Skills -----         | -----                           |  | -----                        | -----                        |
| <b>Friday</b>    | Medicinal Biochemistry CIA     | ←BI----- CIA<br>←BII ----- BRP                 |  | Human Anatomy & Physiology SM  | Pharmaceutics TS   |  | Remedial Maths DHP                 | Medicinal Biochemistry (Tu) GVP |  | Pharm. Organic Chemistry BRP | -----                        |
| <b>Saturday</b>  | Pharm. Inorganic Chemistry BMG | Remedial Maths (Tu) DHP<br>Remedial Biology RG |  |  |  |  |                                    |                                 |  |                              |                              |

\*Effective from: 03<sup>rd</sup> July 2023

Note: 1. No tea break for practicals

Time table Coordinator

Copy: SNB/LNB/SCF/e.copy – teachers/ Office in charge – time table / Time table coordinator

Principal

