



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY ANANTAPUR**

**Academic Regulations of M.Pharmacy (Full Time) Programme**

**(Effective for the students admitted into I year from the Academic Year 2021-22 and onwards)**

Jawaharlal Nehru Technological University Anantapur (JNTUA) offers **Two Years (Four Semesters)** full-time Master of Pharmacy (M.Pharm.) Post Graduate Degree programme, under Choice Based Credit System (CBCS) with different specializations at its constituent unit, OTPRI and non-autonomous affiliated colleges.

The Jawaharlal Nehru Technological University Anantapur shall confer M.Pharm. degree on candidates who are admitted to the programme and fulfill all the requirements for the award of the degree.

**1. Award of the M.Pharm. Degree**

A student will be declared eligible for the award of the M.Pharm. degree if he/she fulfils the following:

- 1.1 Pursues a course of study for not less than two academic years and not more than four academic years.
- 1.2 Registers for 95 credits and secures all 95 credits.

2. Students, who fail to fulfil all the academic requirements for the award of the degree within four academic years from the year of their admission, shall forfeit their seat in M.Pharm. course and their admission stands cancelled.

**3. Programme of Study:**

The following M.Pharm. specializations are offered at its constituent (non-autonomous) unit, OTPRI & affiliated (non-autonomous) colleges:

S.No.	Discipline	Name of the Specialization	Code
1	Master of Pharmacy	Pharmacology	
2		Pharmaceutical Chemistry	
3		Pharmaceutics	
4		Pharmaceutical Analysis and Quality Assurance	
5		Pharmacognosy	
6		Industrial Pharmacy	
7		Pharmaceutical Technology	
8		Pharmaceutical Analysis	
9		Pharmacy Practice	
10		Pharmaceutics-Drug Regulatory Affairs	
11		Pharmaceutical Quality Assurance	

and any other specializations as approved by AICTE/PCI/University from time to time.

**4. Eligibility for Admissions:**

- 4.1 Admission to the M.Pharm. programme shall be made subject to the eligibility, qualifications and specialization prescribed by the A.P. State Government/University for each programme, from time to time.
- 4.2 Admissions shall be made on the basis of either the merit rank or Percentile obtained by the qualified student in the relevant qualifying GPAT Examination / the merit rank obtained by the qualified student in an entrance test conducted by A.P. State Government (APPGECET) for M.Pharm. programmes/an entrance test conducted by university/ on the basis of any other exams approved by the University, subject to reservations as laid down by the Govt. from time to time.

**5. Programme related terms:**

- 5.1 **Credit:** A unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (Lecture/Tutorial) or two hours of practical work/field work per week.

Credit definition:

1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
1 Hr. Practical (P) per week	0.5 credit

- 5.2 **Academic Year:** Two consecutive (one odd + one even) semesters constitute one academic year.
- 5.3 **Choice Based Credit System (CBCS):** The CBCS provides choice for students to select from the prescribed courses.

**6. Programme Pattern:**

- 6.1 Total duration of the of M.Pharm. programme is two academic years
- 6.2 Each academic year of study is divided into two semesters.
- 6.3 Each Semester shall be of 22 weeks duration (inclusive of Examinations), with a minimum of 90 instructional days per semester.
- 6.4 The student shall not take more than four academic years to fulfill all the academic requirements for the award of M.Pharm. degree from the date of commencement of first year first semester, failing which the student shall forfeit the seat in M.Pharm. programme.
- 6.5 The medium of instruction of the programme (including examinations and project reports) will be in English only.
- 6.6 All subjects/courses offered for the M.Pharm. programme are broadly classified as follows:

S.No.	Broad Course Classification	Course Category	Description
1.	Core Courses	Foundational & Professional Core Courses (PC)	Includes subjects related to the parent discipline



2.	Elective Courses	Electives	Includes elective subjects related to the parent discipline/inter-disciplinary subjects or subjects in an area outside the parent discipline which are of importance in the context of special skill development
3.	Research	Research methodology & IPR	To understand importance and process of creation of patents through research
		Seminar	Ensures preparedness of students to undertake major projects/Dissertation, based on core contents related to specialization
		Cocurricular Activities/Journal Club	Attending conferences, scientific presentations and other scholarly activities
		Dissertation	Major Project
4.	Audit Courses	Mandatory noncredit courses	Covering subjects of developing desired attitude among the learners is on the line of initiatives such as Unnat Bharat Abhiyan, Yoga, Value education etc.

- 6.7 The college shall take measures to implement Virtual Labs (<https://www.vlab.co.in>) which provide remote access to labs in various disciplines of science and will help student in learning basic and advanced concept through remote experimentation. Student shall be made to work on virtual lab experiments during the regular labs.
- 6.8 A faculty advisor/mentor shall be assigned to each specialization to advise students on the programme, its Course Structure and Curriculum, Choice of Courses, based on his competence, progress, pre-requisites and interest.
- 6.9 Preferably 25% course work for the theory courses in every semester shall be conducted in the blended mode of learning.

## **7. Attendance Requirements:**

- 7.1 A student shall be eligible to appear for the University external examinations if he/she acquires i) a minimum of 50% attendance in each course and ii) 75% of attendance in aggregate of all the courses.
- 7.2 Condonation of shortage of attendance in aggregate up to 10% (65% and above and below 75%) in each semester may be granted by the College Academic Committee.
- 7.3 Condonation of shortage of attendance shall be granted only on genuine and valid reasons on representation by the candidate with supporting evidence
- 7.4 Students whose shortage of attendance is not condoned in any semester are not eligible to take their end examination of that class.
- 7.5 A stipulated fee shall be payable towards condonation of shortage of attendance.
- 7.6 A student will not be promoted to the next semester unless he satisfies the attendance requirements of the present semester. They may seek re-admission into that semester when offered next.



- 7.7 If any candidate fulfils the attendance requirement in the present semester, he shall not be eligible for readmission into the same class.
- 7.8 If the learning is carried out in blended mode (both offline & online), then the total attendance of the student shall be calculated considering the offline and online attendance of the student.

## 8. Evaluation – Distribution and Weightage of Marks:

The performance of a student in each semester shall be evaluated subject - wise (irrespective of credits assigned), for a maximum of 100 marks for theory and 100 marks for practical, based on Internal Evaluation and End Semester Examination.

- 8.1 There shall be five units in each of the theory subjects. For the theory subjects 60 marks will be for the End Examination and 40 marks will be for Internal Evaluation.
- 8.2 Two Internal Examinations shall be conducted for 30 marks each, one in the middle of the Semester and the other immediately after the completion of instruction. First mid examination shall be conducted for I & II units of the syllabus and second mid examination for III, IV & V units. Each mid exam shall be conducted for a total duration of 120 minutes with 3 questions (without choice) each question for 10 marks. Final Internal marks for a total of 30 marks shall be arrived at by considering the marks secured by the student in both the internal examinations with 80% weightage to the better internal exam and 20% to the other. There shall be an online examination (TWO) conducted during the respective mid examinations by the college for the remaining 10 marks with 20 objective questions.
- 8.3 The following pattern shall be followed in the End Examination:
- Five questions shall be set from each of the five units with either/or type for 12 marks each.
  - All the questions have to be answered compulsorily.
  - Each question may consist of one, two or more bits.
- 8.4 For practical subjects, 60 marks shall be for the End Semester Examinations and 40 marks will be for internal evaluation based on the day-to-day performance.
- The internal evaluation based on the day-to-day work-10 marks, record- 10 marks and the remaining 20 marks to be awarded by conducting an internal laboratory test. The end examination shall be conducted by the examiners, with a breakup mark of Procedure-10, Experimentation-25, Results-10, Viva-voce-15.
- 8.5 There shall be a **Seminar/Assignment** for internal evaluation of 100 marks. A student under the supervision of a faculty member, shall collect the literature on a topic and critically review the literature and submit it to the department in a report form and shall make an oral presentation before the Project Review Committee consisting of Head of the Department, supervisor/mentor and two



other faculty members of the department. The student has to secure a minimum of 50% of marks, to be declared successful. If he fails to obtain the minimum marks, he has to reappear for the same as and when supplementary examinations are conducted. The seminar shall be conducted anytime during the semester as per the convenience of the Project Review Committee and students. There shall be no external examination for Technical Seminar.

- 8.6 For Teaching Practice/Assignments there will be an internal evaluation of 100 marks. A candidate has to secure a minimum of 50% to be declared successful. Student has to teach 10 Hours in his/her interesting subject/subjects in the entire III Semester instruction period for his juniors at PG level or Undergraduate students who are available on the campus. For each teaching hour maximum of 10 marks are allotted. The assessment will be made by the faculty allotted by the HoD.
- 8.7 There shall be Mandatory **Audit courses** for zero credits. There is no external examination for audit courses. However, attendance shall be considered while calculating aggregate attendance and student shall be declared to have passed the mandatory course only when he/she secures 50% or more in the internal examinations. In case, the student fails, a re-examination shall be conducted for failed candidates for 40 marks every six months/semester satisfying the conditions mentioned in item 1 & 2 of the regulations.
- 8.8 There shall be **Comprehensive Viva-Voce** in III semester. This will test the student's learning and understanding during the course of their specialization. The Comprehensive viva-voce will be conducted by the committee consisting of Head of the Department and two faculty members related to the specialization. The Comprehensive Viva-Voce shall be evaluated for 100 marks by the committee. There are no internal marks for the Comprehensive Viva-Voce. A student shall acquire 2 credits assigned to the Comprehensive Viva-voce when he/she secures 50% or more marks for the total of 100 marks. In case, if a student fails in Comprehensive Viva-voce he/she shall reappear as and when III semester supplementary examinations are conducted.
- 8.9 A candidate shall be deemed to have secured the minimum academic requirement in a subject if he secures a minimum of 40% of marks in the End Examination and a minimum aggregate of 50% of the total marks in the End Semester Examination and Internal Evaluation taken together.
- 8.10 In case the candidate does not secure the minimum academic requirement in any of the subjects he/she has to reappear for the Semester Examination either supplementary or regular in that subject or repeat the course when next offered or do any other specified subject as may be required.
- 8.11 The laboratory records and mid semester test papers shall be preserved for a minimum of 3 years in the respective institutions as per the University norms and shall be produced to the Committees of the University as and when the same are asked for.



## **9. Credit Transfer Policy**

As per University Grants Commission (Credit Framework for Online Learning Courses through SWAYAM) Regulation, 2016, the University shall allow up to a maximum of 40% of the total courses being offered in a particular Programme in a semester through the Online Learning courses through SWAYAM.

- 9.1 The University shall offer credit mobility for MOOCs and give the equivalent credit weightage to the students for the credits earned through online learning courses through SWAYAM platform.
  - 9.2 The online learning courses available on the SWAYAM platform will be considered for credit transfer. SWAYAM course credits are as specified in the platform
  - 9.3 Student registration for the MOOCs shall be only through the institution, it is mandatory for the student to share necessary information with the institution
  - 9.4 The institution shall select the courses to be permitted for credit transfer through SWAYAM. However, while selecting courses in the online platform institution would essentially avoid the courses offered through the curriculum in the offline mode.
  - 9.5 The institution shall notify at the beginning of semester the list of the online learning courses eligible for credit transfer in the forthcoming Semester.
  - 9.6 The institution shall also ensure that the student has to complete the course and produce the course completion certificate as per the academic schedule given for the regular courses in that semester
  - 9.7 The institution shall designate a faculty member as a Mentor for each course to guide the students from registration till completion of the credit course.
  - 9.8 The university shall ensure no overlap of SWAYAM MOOC exams with that of the university examination schedule. In case of delay in SWAYAM results, the university will re-issue the marks sheet for such students.
  - 9.9 Student pursuing courses under MOOCs shall acquire the required credits only after successful completion of the course and submitting a certificate issued by the competent authority along with the percentage of marks and grades.
  - 9.10 The institution shall submit the following to the examination section of the university:
    - a) List of students who have passed MOOC courses in the current semester along with the certificates of completion.
    - b) Undertaking form filled by the students for credit transfer.
  - 9.11 The university shall resolve any issues that may arise in the implementation of this policy from time to time and shall review its credit transfer policy in the light of periodic changes brought by UGC, SWAYAM, NPTEL and state govt.
- Note:** Students shall also be permitted to register for MOOCs offered through online platforms other than SWAYAM NPTEL. In such cases, credit transfer shall be permitted only after seeking approval of the University at least three months prior to the commencement of the semester.



**10. Re-registration for Improvement of Internal Evaluation Marks:**

A candidate shall be given one chance to re-register for each subject provided the internal marks secured by a candidate are less than 50% and has failed in the end examination

- 10.1 The candidate should have completed the course work and obtained examinations results for **I, II and III** semesters.
- 10.2 The candidate should have passed all the subjects for which the Internal Evaluation marks secured are more than 50%.
- 10.3 Out of the subjects the candidate has failed in the examination due to Internal Evaluation marks secured being less than 50%, the candidate shall be given one chance for each Theory subject and for a maximum of **three** Theory subjects for Improvement of Internal evaluation marks.
- 10.4 The candidate has to re-register for the chosen subjects and fulfill the academic requirements.
- 10.5 For reregistration the candidates have to apply to the University through the college by paying the requisite fees and get approval from the University before the start of the semester in which re-registration is required
- 10.6 In the event of availing the Improvement of Internal evaluation marks, the internal evaluation marks as well as the End Examinations marks secured in the previous attempt(s) for the reregistered subjects stand cancelled.

**11. Evaluation of Project/Research Work:**

The Project work shall be initiated at the beginning of the III Semester and the duration of the Project is of two semesters. Evaluation of Project work is for 300 marks with 200 marks for internal evaluation and 100 marks for external evaluation. Internal evaluation of the Project Work – I & Project work – II in III & IV semesters respectively shall be for 100 marks each. External evaluation of final Project work viva voce in IV semester shall be for 100 marks.

A Project Review Committee (PRC) shall be constituted with the Head of the Department as Chairperson, Project Supervisor and one faculty member of the department offering the M.Pharm. programme.

- 11.1 A candidate is permitted to register for the Project Work in III Semester after satisfying the attendance requirement in all the subjects, both theory and laboratory (in I & II semesters).
- 11.2 A candidate is permitted to submit Project dissertation with the approval of PRC. The candidate has to pass all the theory, practical and other courses before submission of the Thesis.
- 11.4 Project work shall be carried out under the supervision of teacher in the parent department concerned.
- 11.5 A candidate shall be permitted to work on the project in an industry/research organization on the recommendation of the Head of the Department. In such cases, one of the teachers from the department concerned would be the internal





guide and an expert from the industry/ research organization concerned shall act as co-supervisor/ external guide. It is mandatory for the candidate to make full disclosure of all data/results on which they wish to base their dissertation. They cannot claim confidentiality simply because it would come into conflict with the Industry's or R&D laboratory's own interests. A certificate from the external supervisor is to be included in the dissertation.

- 11.6 Continuous assessment of Project Work - I and Project Work – II in III & IV semesters respectively will be monitored by the PRC.
- 11.7 The candidate shall submit status report by giving seminars in three different phases (two in III semester and one in IV semester) during the project work period. These seminar reports must be approved by the PRC before submission of the Project Thesis.
- 11.8 After registration, a candidate must present in Project Work Review - I, in consultation with his Project Supervisor, the title, objective and plan of action of his Project work to the PRC for approval within four weeks from the commencement of III Semester. Only after obtaining the approval of the PRC can the student initiate the project work.
- 11.9 The Project Work Review - II in III semester carries internal marks of 100. Evaluation should be done by the PRC for 50 marks and the Supervisor will evaluate the work for the other 50 marks. The Supervisor and PRC will examine the Problem Definition, Objectives, Scope of Work, Literature Survey in the same domain and progress of the Project Work.
- 11.10 A candidate has to secure a minimum of 50% of marks to be declared successful in Project Work Review - II. Only after successful completion of Project Work Review – II, candidate shall be permitted for Project Work Review – III in IV Semester. The unsuccessful students in Project Work Review - II shall reappear for it as and when supplementary examinations are conducted.
- 11.11 The Project Work Review - III in IV semester carries 100 internal marks. Evaluation should be done by the PRC for 50 marks and the Supervisor will evaluate it for the other 50 marks. The PRC will examine the overall progress of the Project Work and decide whether or not eligible for final submission. A candidate has to secure a minimum of 50% of marks to be declared successful in Project Work Review - III. If he fails to obtain the required minimum marks, he has to reappear for Project Work Review - III after a month.
- 11.12 For the approval of PRC the candidate shall submit the draft copy of dissertation to the Head of the Department and make an oral presentation before the PRC.
- 11.13 After approval from the PRC, the students are required to submit a report showing that the plagiarism is within 30%. The dissertation report will be accepted only when the plagiarism is within 30%, which shall be submitted along with the dissertation report.





- 11.14 Research paper related to the Project Work shall be published in conference proceedings/UGC recognized journal. A copy of the published research paper shall be attached to the dissertation.
- 11.15 After successful plagiarism check and publication of research paper, three copies of the dissertation certified by the supervisor and HOD shall be submitted to the College.
- 11.16 The dissertation shall be adjudicated by an external examiner selected by the University. For this, the Principal of the College shall submit a panel of three examiners as submitted by the supervisor concerned and department head for each student. However, the dissertation will be adjudicated by one examiner nominated by the University.
- 11.17 If the report of the examiner is not satisfactory, the candidate shall revise and resubmit the dissertation, in the time frame as decided by the PRC. If report of the examiner is unfavorable again, the thesis shall be summarily rejected. The candidate has to reregister for the project and complete the project within the stipulated time after taking the approval from the University.
- 11.18 If the report of the examiner is satisfactory, the Head of the Department shall coordinate and make arrangements for the conduct of Project Viva voce exam.
- 11.19 The Project Viva voce examinations shall be conducted by a board consisting of the Supervisor, Head of the Department and the external examiner who has adjudicated the dissertation. For Dissertation Evaluation (Viva voce) in IV Sem. there are external marks of 100 and it is evaluated by external examiner. The candidate has to secure a minimum of 50% marks in Viva voce exam.
- 11.20 If he fails to fulfill the requirements as specified, he will reappear for the Project Viva voce examination only after three months. In the reappeared examination also, if he fails to fulfill the requirements, he will not be eligible for the award of the degree.

## **12. Credits for Co-curricular Activities**

The credits assigned for co-curricular activities shall be given by the principals of the colleges and the same shall be submitted to the University.

A Student shall earn 02 credits under the head of co-curricular activities, viz., attending Conference, Scientific Presentations and Other Scholarly Activities.

Following are the guidelines for awarding Credits for Co-curricular Activities

<b>Name of the Activity</b>	<b>Maximum Credits / Activity</b>
Participation in National Level Seminar/ Conference / Workshop /Training programs (related to the specialization of the student)	1
Participation in International Level Seminar / Conference / workshop/Training programs held outside India (related to the specialization of the student)	2
Academic Award/Research Award from State Level/National	1



Agencies	
Academic Award/Research Award from International Agencies	2
Research / Review Publication in National Journals (Indexed in Scopus / Web of Science)	1
Research / Review Publication in International Journals with Editorial board outside India (Indexed in Scopus / Web of Science)	2

**Note:**

- Credit shall be awarded only for the first author. Certificate of attendance and participation in a Conference/Seminar is to be submitted for awarding credit.
- Certificate of attendance and participation in workshops and training programs (Internal or External) is to be submitted for awarding credit. The total duration should be at least one week.
- Participation in any activity shall be permitted only once for acquiring required credits under cocurricular activities

**13. Grading:**

As a measure of the student's performance, a 10-point Absolute Grading System using the following Letter Grades and corresponding percentage of marks shall be followed:

After each course is evaluated for 100 marks, the marks obtained in each course will be converted to a corresponding letter grade as given below, depending on the range in which the marks obtained by the student fall.

**Structure of Grading of Academic Performance**

Range in which the marks in the subject fall	Grade	Grade points Assigned
$\geq 90$	S (Superior)	10
$\geq 80 < 90$	A (Excellent)	9
$\geq 70 < 80$	B (Very Good)	8
$\geq 60 < 70$	C (Good)	7
$\geq 50 < 60$	D (Pass)	6
$< 50$	F (Fail)	0
Absent	Ab (Absent)	0

- A student obtaining Grade 'F' or Grade 'Ab' in a subject shall be considered failed and will be required to reappear for that subject when it is offered the next supplementary examination.
- For noncredit audit courses, "Satisfactory" or "Unsatisfactory" shall be indicated instead of the letter grade and this will not be counted for the computation of SGPA/CGPA/Percentage.

**Computation of Semester Grade Point Average (SGPA) and Cumulative Grade Point Average (CGPA):**

The Semester Grade Point Average (SGPA) is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by



a student and the sum of the number of credits of all the courses undergone by a student, i.e.,

$$SGPA = \Sigma (C_i \times G_i) / \Sigma C_i$$

where,  $C_i$  is the number of credits of the  $i^{th}$  subject and  $G_i$  is the grade point scored by the student in the  $i^{th}$  course.

- i) The Cumulative Grade Point Average (CGPA) will be computed in the same manner considering all the courses undergone by a student over all the semesters of a program, i.e.,

$$CGPA = \Sigma (C_i \times S_i) / \Sigma C_i$$

where " $S_i$ " is the SGPA of the  $i^{th}$  semester and  $C_i$  is the total number of credits up to that semester.

- ii) Both SGPA and CGPA shall be rounded off to 2 decimal points and reported in the transcripts.
- iii) While computing the SGPA the subjects in which the student is awarded Zero grade points will also be included.

Grade Point: It is a numerical weight allotted to each letter grade on a 10-point scale.

Letter Grade: It is an index of the performance of students in a said course. Grades are denoted by letters S, A, B, C, D and F.

#### **14. Award of Class:**

After a student has satisfied the requirements prescribed for the completion of the program and is eligible for the award of M. Pharm. Degree, he shall be placed in one of the following three classes:

<b>Class Awarded</b>	<b>Percentage of Marks to be secured</b>
First Class with Distinction	$\geq 70\%$
First Class	$< 70\% \geq 60\%$
Pass Class	$< 60\% \geq 50\%$

15. **Exit Policy:** The student shall be permitted to exit with a PG Diploma based on his/her request to the university through the respective institution at the end of first year subject to passing all the courses in first year.

The University shall resolve any issues that may arise in the implementation of this policy from time to time and shall review the policy in the light of periodic changes brought by UGC, PCI, AICTE and State government.

#### **16. Withholding of Results:**

If the candidate has any case of in-discipline pending against him, the result of the candidate shall be withheld, and he will not be allowed/promoted into the next higher semester. The issue of degree is liable to be withheld in such cases.



**17. Transitory Regulations**

Discontinued, detained, or failed candidates are eligible for readmission as and when the semester is offered after fulfilment of academic regulations. Candidates who have been detained for want of attendance or not fulfilled academic requirements or who have failed after having undergone the course in earlier regulations or have discontinued and wish to continue the course are eligible for admission into the unfinished semester from the date of commencement of class work with the same or equivalent subjects as and when subjects are offered, subject to Section 2 and they will follow the academic regulations into which they are readmitted.

**18. General:**

- 17.1 The academic regulations should be read as a whole for purpose of any interpretation.
- 17.2 Disciplinary action for Malpractice/improper conduct in examinations is appended.
- 17.3 There shall be no places transfer within the constituent colleges and affiliated colleges of Jawaharlal Nehru Technological University Anantapur.
- 17.4 Where the words “he”, “him”, “his”, occur in the regulations, they include “she”, “her”, “hers”.
- 17.5 In the case of any doubt or ambiguity in the interpretation of the above rules, the decision of the Vice-Chancellor is final.
- 17.6 The University may change or amend the academic regulations or syllabi at any time and the changes or amendments shall be made applicable to all the students on rolls with effect from the dates notified by the University.

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**RULES FOR**

**DISCIPLINARY ACTION FOR MALPRACTICES / IMPROPER CONDUCT IN EXAMINATIONS**

	<b>Nature of Malpractices/Improper conduct</b>	<b>Punishment</b>
	<i>If the candidate:</i>	
1.(a)	Possesses or keeps accessible in examination hall, any paper, note book, programmable calculators, Cell phones, pager, palm computers or any other form of material concerned with or related to the subject of the examination (theory or practical) in which he is appearing but has not made use of (material shall include any marks on the body of the candidate which can be used as an aid in the subject of the examination)	Expulsion from the examination hall and cancellation of the performance in that subject only.
(b)	Gives assistance or guidance or receives it from any other candidate orally or by any other body language methods or communicates through cell phones with any candidate or persons in or outside the exam hall in respect of any matter.	Expulsion from the examination hall and cancellation of the performance in that subject only of all the candidates involved. In case of an outsider, he will be handed over to the police and a case is registered against him.
2.	Has copied in the examination hall from any paper, book, programmable calculators, palm computers or any other form of material relevant to the subject of the examination (theory or practical) in which the candidate is appearing.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. The Hall Ticket of the candidate is to be cancelled and sent to the University.
3.	Impersonates any other candidate in connection with the examination.	The candidate who has impersonated shall be expelled from examination hall. The candidate is also debarred for four consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. The performance of the original candidate who has been impersonated, shall be cancelled in all the subjects of the examination (including practicals and project work) already appeared and shall not be allowed to appear for examinations of the remaining subjects of that semester/year. The candidate is also debarred for four consecutive semesters from class work and all University examinations if his involvement is established. Otherwise, the candidate is debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat. If the imposter is an outsider, he will be handed over to the police and a case is registered against him.



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4.	Smuggles in the Answer book or additional sheet or takes out or arranges to send out the question paper during the examination or answer book or additional sheet, during or after the examination.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
5.	Uses objectionable, abusive or offensive language in the answer paper or in letters to the examiners or writes to the examiner requesting him to award pass marks.	Cancellation of the performance in that subject only.
6.	Refuses to obey the orders of the Chief Superintendent /Assistant - Superintendent /any officer on duty or misbehaves or creates disturbance of any kind in and around the examination hall or organizes a walk out or instigates others to walk out, or threatens the officer-in charge or any person on duty in or outside the examination hall of any injury to his person or to any of his relations whether by words, either spoken or written or by signs or by visible representation, assaults the officer-in-charge, or any person on duty in or outside the examination hall or any of his relations, or indulges in any other act of misconduct or mischief which result in damage to or destruction of property in the examination hall or any part of the College campus or engages in any other act which in the opinion of the officer on duty amounts to use of unfair means or misconduct or has the tendency to disrupt the orderly conduct of the examination.	In case of students of the college, they shall be expelled from examination halls and cancellation of their performance in that subject and all other subjects the candidate(s) has (have) already appeared and shall not be permitted to appear for the remaining examinations of the subjects of that semester/year. If the candidate physically assaults the invigilator/officer-in-charge of the Examinations, then the candidate is also debarred and forfeits his/her seat. In case of outsiders, they will be handed over to the police and a police case is registered against them.
7.	Leaves the exam hall taking away answer script or intentionally tears of the script or any part thereof inside or outside the examination hall.	Expulsion from the examination hall and cancellation of performance in that subject and all the other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred for two consecutive semesters from class work and all University examinations. The continuation of the course by the candidate is subject to the academic regulations in connection with forfeiture of seat.
8.	Possess any lethal weapon or firearm in the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat.
9.	If student of the college, who is not a candidate for the particular examination or any person not connected with the college indulges in any malpractice or improper conduct mentioned in clause 6 to 8.	Student of the colleges expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining





## M.Pharm. R21 Regulations

		examinations of the subjects of that semester/year. The candidate is also debarred and forfeits the seat. Person (s) who do not belong to the College will be handed over to police and, a police case will be registered against them.
10.	Comes in a drunken condition to the examination hall.	Expulsion from the examination hall and cancellation of the performance in that subject and all other subjects the candidate has already appeared including practical examinations and project work and shall not be permitted for the remaining examinations of the subjects of that semester/year.
11.	Copying detected on the basis of internal evidence, such as, during valuation or during special scrutiny.	Cancellation of the performance in that subject only or in that subject and all other subjects the candidate has appeared including practical examinations and project work of that semester / year examinations, depending on the recommendation of the committee.
12.	If any malpractice is detected which is not covered in the above clauses 1 to 11 shall be reported to the University for further action to award suitable punishment.	

1. Malpractices identified by squad or special invigilators
2. Punishments to the candidates as per the above guidelines.
3. Punishment for institutions: (if the squad reports that the college is also involved in encouraging malpractices)
4. A show cause notice shall be issued to the college.
5. Impose a suitable fine on the college.
6. Shifting the examination center from the college to another college for a specific period of not less than one year.

### Note:

Whenever the performance of a student is cancelled in any subject/subjects due to Malpractice, he has to register for End Examinations in that subject/subjects consequently and has to fulfil all the norms required for the award of Degree.

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**COURSE STRUCTURE & SYLLABI**

**SEMESTER – I**

S. No.	Course codes	Course Name	Hours per week			Credits
			L	T	P	
1.	21S01101	Modern Pharmaceutical Analytical Techniques	4	-	-	4
2.	21S06101	Advanced Pharmacognosy-1	4	-	-	4
3.	21S06102	Phytochemistry	4	-	-	4
4.	21S06103	Industrial Pharmacognostical Technology	4	-	-	4
5.	21S01105	Modern Pharmaceutical Analytical Techniques Lab	-	-	6	3
6.	21S06104	Advanced Pharmacognosy – I Lab	-	-	6	3
7.	21DAC101a 21DAC101b 21DAC101c	<b>Audit Course – I</b> English for Research paper writing Disaster Management Sanskrit for Technical Knowledge	2	-	-	0
8.	21S06105	Seminar/Assignment	-	1	6	4
		<b>Total</b>	18	1	18	26

**SEMESTER – II**

S.No.	Course codes	Course Name	Hours per week			Credits
			L	T	P	
1.	21S06201	Advanced Pharmacognosy-II	4	-	-	4
2.	21S06202	Indian systems of medicine	4	-	-	4
3.	21S06203	Nutraceuticals and Herbal cosmetics	4	-	-	4
4.	21S06204	Medicinal Plant Biotechnology	4	-	-	4
5.	21S06205	Advanced Pharmacognosy-II Lab	-	-	6	3
6.	21S06206	Nutraceuticals and Herbal cosmetics Lab	-	-	6	3
7.	21DAC201a 21DAC201b 21DAC201c	<b>Audit Course – II</b> Pedagogy Studies Stress Management for Yoga Personality Development through Life Enlightenment Skills	2	-	-	0
8.	21S06207	Seminar/Assignment	-	1	6	4
		<b>Total</b>	18	1	18	26


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**COURSE STRUCTURE**
**SEMSTER - III**

S.No.	Course codes	Course Name	Hours per			Credits
			L	T	P	
1.	21DRM101	Research Methodology and Intellectual Property Right	4	-	-	4
2.	21SOE301d 21SOE301a 21SOE301c	<b>Open Elective</b> Biological Screening methods Pharmaceutical Validation Entrepreneurship Management	3	-	-	3
3.	21S06301	Teaching Practice/Assignment	-	-	4	2
4.	21S06302	Comprehensive viva voce	-	-	-	2
5.	21S06303	Research Work - I	-	-	24	12
		<b>Total</b>	7	-	32	23

**SEMESTER - IV**

S.No.	Course codes	Course Name	Hours per			Credits
			L	T	P	
1.	21S06401	Co-Curricular Activities	2			2
2.	21S06402	Research Work - II	3		30	18
		<b>Total</b>	5		30	20

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<b>Course Code</b>	<b>MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES</b>		<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>21S01101</b>			<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>
<b>Semester</b>			<b>I</b>			
<b>Course Objectives:</b>						
This subject deals with various advanced analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are NMR, Mass spectrometer, IR, HPLC, GC etc						
<b>Course Outcomes (CO):</b> Student will be able to After completion of course student is able to know about chemicals and excipients.						
<ul style="list-style-type: none"> <li>• The analysis of various drugs in single and combination dosage forms</li> <li>• Theoretical and practical skills of the instruments</li> </ul>						
<b>UNIT - I</b>						
<b>UV-Visible spectroscopy</b> Introduction, Theory, Laws, Instrumentation associated with UV-Visible spectroscopy, Choice of solvents and solvent effect and Applications of UV-Visible spectroscopy, Difference/ Derivative spectroscopy.						
<b>UNIT - II</b>						
<b>IR spectroscopy</b> Theory, Modes of Molecular vibrations, Sample handling, Instrumentation of Dispersive and Fourier -Transform IR Spectrometer, Factors affecting vibrational frequencies and Applications of IR spectroscopy, Data Interpretation						
<b>UNIT - III</b>						
<b>NMR spectroscopy</b> Quantum numbers and their role in NMR, Principle, Instrumentation, Solvent requirement in NMR, Relaxation process, NMR signals in various compounds, Chemical shift, Factors influencing chemical shift, Spin-Spin coupling, Coupling constant, Nuclear magnetic double resonance, Brief outline of principles of FT-NMR and <sup>13</sup> C NMR. Applications of NMR spectroscopy.						
<b>UNIT - IV</b>						
<b>Mass Spectroscopy</b> Principle, Theory, Instrumentation of Mass Spectroscopy, Different types of ionization like electron impact, chemical, field, FAB and MALDI, APCI, ESI, APPI Analyzers of Quadrupole and Time of Flight, Mass fragmentation and its rules, Meta stable ions, Isotopic peaks and Applications of Mass spectroscopy						
<b>UNIT - V</b>	Chromatography					
<b>Chromatography</b> Introduction to chromatography and classification of chromatographic methods based on the mechanism of separation, Principle, instrumentation, selection of solvents; chromatographic parameters, factors affecting resolution, applications of the following: a) Thin Layer chromatography; b) High Performance Thin Layer Chromatography c) Paper Chromatography; d) Column chromatography e) Gas chromatography; f) High Performance Liquid chromatography g) Affinity chromatography; h) Gel Chromatography i)Hyphenated techniques : • Ultra High Performance Liquid chromatography- Mass spectroscopy • Gas Chromatography-Mass Spectroscopy						
<b>Reference Books:</b>						
1. Instrumental Methods of Chemical Analysis by B.K Sharma						



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**COURSE STRUCTURE**

2. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
3. Spectrometric Identification of Organic compounds - Robert M Silverstein, Sixth edition, John Wiley & Sons, 2004.
4. Principles of Instrumental Analysis - Douglas A Skoog, F. James Holler, Timothy A. Nieman, 5th edition, Eastern press, Bangalore, 1998.
5. Instrumental methods of analysis – Willards, 7th edition, CBS publishers.
6. Practical Pharmaceutical Chemistry – Beckett and Stenlake, Vol II, 4<sup>th</sup> edition, CBS Publishers, New Delhi, 1997.
7. Organic Spectroscopy - William Kemp, 3rd edition, ELBS, 1991.
8. Quantitative Analysis of Drugs in Pharmaceutical formulation - P D Sethi, 3rd Edition, CBS Publishers, New Delhi, 1997.
9. Pharmaceutical Analysis - Modern Methods – Part B - J W Munson, Vol 11, Marcel. Dekker Series
10. Spectroscopy of Organic Compounds, 2nd edn., P.S/Kalsi, Wiley eastern Ltd., Delhi.
11. Textbook of Pharmaceutical Analysis, K.A. Connors, 3rd Edition, John Wiley & Sons, 1982.
12. Organic Chemistry by I. L. Finar
13. Quantitative Analysis of Drugs by D. C. Garrett
14. HPTLC by P.D. Seth
15. Indian Pharmacopoeia 2007
16. High Performance thin layer chromatography for the analysis of medicinal plants by Eike
17. Reich, Anne Schibli Introduction to instrumental analysis by Robert. D. Braun



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**COURSE STRUCTURE & SYLLABI**

Course Code	ADVANCED PHARMACOGNOSY- I	L	T	P	C
21S06101		4	0	0	4
Semester		I			
Course Objectives:					
To provide an opportunity for the students to understand the cultivation and utilization aspects of drugs falling under this chapter. Helps the students to get exposed to various techniques of plant tissue culture and explore marine origin natural products					
Course Outcomes (CO): Student will be able to					
The students will gain applicable knowledge about the traditional plants and marine source which helps them to work upon them for proving their use scientifically.					
UNIT – I					
Plant drug cultivation: a) General introduction to the importance of Pharmacognosy in herbal drug industry, Indian Council of Agricultural Research, Current Good Agricultural Practices, Current Good Cultivation Practices. b) Post harvesting techniques and utilization of the following Medicinal and Aromatic plants: Ashwagandha, Saffron, Safed musli, Davana, Pachouli and Lemon grass					
UNIT – II					
A brief account on Chemical and Pharmacological aspects and uses of the following medicinal plants- 1. Immunomodulators a. Asparagus racemosus b. Withania somnifera 2. Antidiabetics a. Gymnema sylvestera b. Momordica charantia 3. Hepatoprotectives a. Phyllanthus amarus b. Silybum marianum 4. Cardioprotectives a. Coleus forskolin b. Cinerarifolium					
UNIT - III					
Marine Pharmacognosy: A brief account of natural products derived from Marine sources with special reference to Cardiovascular, anti-cancer, anti-viral, anti-microbial, anti-parasitic, anticoagulant and anti-inflammatory agents.					
UNIT – IV					
a) Definitions of Functional foods, Nutraceuticals and Dietary supplements. Classification of Nutraceuticals, Health problems and diseases that can be prevented or cured by Nutraceuticals i.e. weight control, diabetes, cancer etc. b) Source, Name of marker compounds and their chemical nature, Medicinal uses and health benefits of following used as nutraceuticals like Spirulina, Soyabean, Ginseng, Ginger, Broccoli, Ginkgo, Flaxseeds, Black cohosh.					
UNIT – V					
Phytopharmaceuticals: Occurrence, isolation and characteristic features (Chemical nature, uses in pharmacy, medicinal and health benefits) of following.					





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### COURSE STRUCTURE

a) Carotenoids – i) $\alpha$ and $\beta$ - Carotene ii) Xanthophylls b) Limonoids – i) d-Limonene ii) $\alpha$ – Terpineol c) Flavonoids – i) Resveratrol ii) Rutin iii) Hesperidin iv) Naringin v) Quercetin d) Phenolic acids- Ellagic acid e) Saponins – Shatavarins f) Vitamins- Tocotrienols and Tocopherols
<b>Textbooks:</b> TEXT BOOKS: 1) Standardization by Botanicals by V.Rajpal , Vol1 , Eastern Publishers New Delhi 2) Cultivation of Medicinal and Aromatic Crops by A A Farooki 3) Advances in Horticulture by Dr. K.L. Chadha 4) Pharmacognosy and Phytochemistry, A Comprehensive Approach 2nd Edition by S.L. Doore, S.S Khadabadi and B.A. Baviskar 5) A Text Book of Pharmacognosy by NPS Senegar, Ritesh Agarwal and Ashwini Singh
<b>Reference Books:</b> 1. Ayurvedic formulary of India, Govt. of India 2. Homeopathic Pharmacopoeia 3. Unani Medical Systems 4. Pharmacopoeial standards for Ayurvedic formulations CCRAS, Delhi 5. Ayurvedic pharmacopoeia 6. Indian herbal pharmacopoeia vol.1 & 2 RRL, IDMA 7. Healing plants of peninsular India by Parrota CABI Publications. 8. Principles of integrated medicines by Mathur PR 9. Handbook of Nutraceuticals and Functional Foods, Third Edition (Modern Nutrition)



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**COURSE STRUCTURE & SYLLABI**

Course Code	PHYTOCHEMISTRY	L	T	P	C
21S06102		4	0	0	4
Semester		I			
<b>Course Objectives:</b>					
Helps the students to get exposed to natural product drug discovery and to perform quantitative and qualitative evaluation of herbal extracts. To understand the chemistry of important phytoconstituents of different categories.					
<b>Course Outcomes (CO):</b> Student will be able to					
On the basis of chemistry data of phytoconstituents students will acquire knowledge on various types of phytoconstituents present in the plants.					
<b>UNIT - I</b>					
Biosynthetic pathways and Radio tracing techniques: containing drugs: a) Methods of Biogenetic Investigations, detailed study of isotropic tracer techniques. b) Study of Biosynthetic pathways of following phyto-pharmaceuticals: Atropine, Morphine, Cardiac glycosides and Flavonoids.					
<b>UNIT - II</b>					
Drug discovery and development: Approaches to discovery and development of natural products as potential new drugs. Sourcing and archiving Natural products for discovery, evaluating natural products for therapeutic properties, identifying the biologically active Natural products, the lead structure selection process and optimization with suitable examples from the following sources: artemesin, andrographolides.					
<b>UNIT - III</b>					
a) Extraction/Isolation methods for specific Phytochemical groups, Choice of solvents and interfering compounds for general Isolation and purification of desired phytoconstituents. b) Recent sophisticated extraction techniques like: Super critical fluid extraction and Ultra-sonic extraction. Separation of phytoconstituents by Vacuum and Flash column chromatography.					
<b>UNIT – IV</b>					
a) Phytochemical finger printing: HPTLC and LCMS/GCMS applications in the characterization of herbal extracts. Structure elucidation of phytoconstituents (Opium, Quinoline & Iso-Quinoline Alkaloids). b) Structure elucidation of the following compounds by spectroscopic techniques like UV, IR, MS, NMR (1H, 13C) a. Carvone, Citral, Menthol b. Luteolin, Kaempferol c. Nicotine, Caffeine d. Glycyrrhizin.					
<b>UNIT – V</b>					
a. Natural colorants: Biological Source, colouring principles, chemical nature and usage of the following Annatto, Cochineal, Caramel, Henna, Indigo, Madder, Saffron, Turmeric b. Flavours and Perfumes: Sandal wood oil, Orange oil, Lemon oil, Palmarosa oil, Geranium oil.					
<b>Textbooks:</b>					
1) Pharmacognosy and phytochemistry by Biren seth 2) Pharmacognosy and Phytochemistry by VD Rangari. 3) Textbook of Pharmacognosy by G.E.Trease, W.C.Evans,ELBS 4) Biosynthetic pathways in Higher Plants by J.B. Pridham and T. Swain, Elsevier Publications 5) A Text Book of Pharmacognosy by NPS Senegar, Ritesh Agarwal and Ashwini Singh					
<b>Reference Books:</b>					



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**M.PHARM. IN PHARMACOGNOSY**

**COURSE STRUCTURE**

- 1) Phytochemical methods of chemical analysis by Harbone
- 2) Modern methods of plant analysis- peach & M.V.Tracey Vol.1 to VII
- 3) Pharmacognosy & Phytochemistry of medical plants by Jean Brunton
- 4) Thin layer chromatography by Stahl
- 5) Chemistry of natural products by Atur Rahman
- 6) Comprehensive Medicinal Chemistry, Vol 1-6, Elsevier Publication
- 7) Medicinal Chemistry Drug Discovery by Donald J, Abrahm,
- 8) Plant drug analysis by Wagner
- 9) Clarke's isolation & identification of drugs by AC Mottal
- 10) Chromatography of Alkaloids by Varpoorte Swendson
- 11) Jenkins Quantitative pharmaceutical chemistry by AN Kenwell
- 12) Standardisation of botanicals by V. Rajpal Vol 1 & 2
- 13) Medicinal chemistry and drug discovery by Burger's
- 14) Foye's Principles of medicinal chemistry .
- 15) Herbal Perfumes and cosmetics by Panda
- 16) Herbal Drug Technology by SS Agarwal



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**COURSE STRUCTURE & SYLLABI**

Course Code	INDUSTRIAL PHARMACOGNOSTICAL TECHNOLOGY	L	T	P	C
21S06103		4	0	0	4
Semester		I			
<b>Course Objectives:</b>					
To understand the Industrial and commercial potential of drugs of natural origin, integrate traditional Indian systems of medicine with modern medicine and also to know regulatory and quality policy for the trade of herbals and drugs of natural origin.					
<b>Course Outcomes (CO):</b> Student will be able to					
By the end of the course the student shall be able to know: The requirements for setting up the herbal/natural drug industry. The guidelines for quality of herbal/natural medicines and regulatory issues. The patenting/IPR of herbals/natural drugs and trade of raw and finished materials.					
UNIT – I					
Herbal drug industry: a) Study of infrastructure, staff requirements, project profile, plant and equipment applicable to herbal drug industry. Plant design, layout and construction. Pilot plant scale –up techniques. b) GMP and GLP					
UNIT – II					
Regulatory requirements for setting herbal drug industry: Global marketing management. Regulatory requirements Export - Import (EXIM) policy. TRIPS Quality assurance in herbal/ natural drug products. Concepts of TQM, ISO-9000.					
UNIT – III					
a) A brief account of companies making herbal drug formulations: List of formulations containing single herbal powder/extract, poly herbal powder/ extracts and their composition and uses. b) Monographs of herbal drugs: General parameters of monographs of herbal drugs in Ayurvedic Pharmacopoeia, Herbal Pharmacopoeia.					
UNIT – IV					
a) Testing of natural products and drugs: Herbal medicines - clinical laboratory testing. b) Stability testing of natural products: Indicative substances for quality assurance, GMP and HACCP in traditional system of medicine, methods of stabilization validation of analytical procedures.					
UNIT – V					
Patents: Patenting of herbal drugs: Benefits of patent protection, Patent application, drafting and filing an application. Indian and international patent laws, proposed amendments as applicable to herbal/natural products and process. Geographical indication, Copyright, Patentable subject matters, novelty, non obviousness, utility, patent processing and grant of patents.					
<b>Textbooks:</b>					
1. Herbal drug industry by R.D. Choudhary (1996), Eastern Publisher, New Delhi. 2. Text book of Pharmacognosy and Phytochemistry by Vinod D. RangarI (2002), Part I & II, Career Publication, Nasik, India. 3. Quality control of herbal drugs by P.K. Mukherjee 4. Herbal Drug Technology by SS Agarwal and paridhavi 5. Pharmacognosy and Phytochemistry, A Comprehensive Approach 2nd Edition by S.L. Doore, S.S Khadabadi and B.A. Baviskar					
<b>Reference Books:</b>					
(Latest Editions of)					
1. GMP for Botanicals - Regulatory and Quality issues on Phytomedicine by Pulok K Mukharjee					



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**COURSE STRUCTURE**

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| <p>(2003) 1st Edition, Business horizons Robert Verpoorte, New Delhi.</p> <p>3. Quality control of herbal drugs by Pulok K Mukarjee (2002), Business Horizons Pharmaceutical Publisher, New Delhi.</p> <p>4. PDR for Herbal Medicines (2000), Medicinal Economic Company, New Jersey.</p> <p>5. Herbal Drugs Quality and Chemistry by D. D. Joshi</p> |
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**COURSE STRUCTURE & SYLLABI**

Course Code	MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES LAB	L	T	P	C
21S01105		0	0	6	3
Pre-requisite		Semester	I		
1. Analysis of Pharmacopoeial compounds and their formulations by UV Vis Spectrophotometer. 2. Simultaneous estimation of multi component containing formulations by UV Spectrophotometry 3. Effect of pH and solvent on UV –Spectrum 4. Determination of Molar absorption coefficient 5. Estimation of riboflavin/ quinine sulphate by fluorimetry 6. Study of quenching effect by fluorimetry 7. Estimation of sodium or potassium by flame photometry 8. Colorimetric determination of drugs by using different reagents 9. Quantitative determination of functional groups 10. Experiments based on Column chromatography 11. Experiments based on HPLC 12. Experiments based on Gas Chromatography					




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**COURSE STRUCTURE**

Course Code	ADVANCED PHARMACOGNOSY-I Lab	L	T	P	C
21S06104		0	0	6	3
Semester		I			
1. Phytochemical screening.					
2. Fluorescence analysis of biodrugs.					
3. Development of fingerprint of selected medicinal plant extracts commonly used in herbal drug industry viz. Ashwagandha, Tulsi, Bael, Amla, Ginger,Aloe, Vidang, Senna, Lawsonia by PC & TLC/HPTLC methods.					
4. Determination of leaf constants.					
5. Determination of volatile oil content.					
6. Monograph analysis of Volatile oil like Clove oil.					
7. Monograph analysis of fixed oil like Castor oil.					
8. Identification of bioactive constituents from plant extracts.					
9. Estimation of bioactive constituents.					
10. Formulation of different dosage forms and their standardization.					
11. Preparation and standardization of simple ISM dosage forms.					
12. Preparation of aromatherapy formulation.					



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**COURSE STRUCTURE & SYLLABI**

Course Code	ADVANCED PHRMACOGNOSY-II	L	T	P	C
21S06201		4	0	0	4
Semester		II			
Course Objectives:					
Helps the students to know about common bitters, laxatives and the analytical profiles of some herbal drugs and herbal cosmetics used in everyday life.					
Course Outcomes (CO): Student will be able to					
Upon completion of the course, the student shall be able to know the, standardization and evaluation techniques for the herbal drugs.					
UNIT - I					
Adulteration and Deterioration: Introduction, Types of Adulteration/ Substitution of Herbal drugs, Causes and Measures of Adulteration, Sampling Procedures, Determination of Foreign Matter, DNA Finger printing techniques in identification of drugs of natural origin, detection of heavy metals, pesticide residues, microbial contamination in herbs and their formulations.					
UNIT – II					
a) A brief account on standardization parameters of herbal drugs. b) Analytical Profiles of herbal drugs: Andrographis paniculata, Boswellia serata, Coleus forskholii, Curcuma longa, Embelica officinalis, Psoralea corylifolia.					
UNIT – III					
a) Vegetable bitters: Biological source, Chemical Nature and description of bitter principles, and of the following – Chirata, Quassia, Calumba, Calamus, Cusparia, Serpentaria b) Vegetable Laxatives: Biological source, Chemical Nature and description of purgation actions and therapeutics of the following: Senna, Cascara, Rubarb, Aloes, Isapgul, agar, castor oil					
UNIT – IV					
Ethnobotany and Ethnopharmacology: Ethnobotany in herbal drug evaluation, Impact of Ethnobotany in traditional medicine, New development in herbals, Bio-prospecting tools for drug discovery, Role of Ethnopharmacology in drug evaluation, Reverse Pharmacology.					
UNIT – V					
Biological screening of herbal drugs: Introduction and need for Phyto Pharmacological screening new strategies for evaluating Natural products, invitro evaluation techniques for antioxidants, antimicrobial. invivo evaluation of antiulcer, anticancer, wound healing, Hepatoprotectives					
Textbooks:					
TEXT BOOKS					
1. Quality control of herbal drugs by P.K. Mukherjee 2. Standardization of botanicals by V. Rajpal, Vol I &II 3. Herbal Drug industry by Paridhavi 4. Pharmacognosy and Phytochemistry, A Comprehensive Approach 2nd Edition by S.L. Doore, S.S Khadabadi and B.A. Baviskar 5. A Text Book of Pharmacognosy by NPS Senegar, Ritesh Agarwal and Ashwini Singh					
Reference Books:					
1. Phytochemical methods of chemical analysis by Harbone 2. Indian herbal Pharmacopoeia 3. Dietetics by Sri Lakshmi 4. Herbal Drug industry by Chowdary					



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## M.PHARM. IN PHARMACOGNOSY

### COURSE STRUCTURE

Course Code	INDIAN SYSTEM OF MEDICINE	L	T	P	C
21S06202		4	0	0	4
Semester		II			
<b>Course Objectives:</b>					
Course objectives: Exposure to principles and concepts of alternative systems of medicine like ayurveda, siddha, homeopathy and unani medicine. To acquire knowledge on the methods of preparation and use of formulations of various systems of medicines.					
<b>Course Outcomes (CO):</b> Student will be able to					
Helps the students in understanding the influence of various alternative systems of medicine in the development of herbal drugs.					
<b>UNIT - I</b>					
Introduction to various systems of Indigenous Medicine. Principles and Concepts of Ayurveda, History and Development of Ayurvedic medicine. Introduction to different dosage forms and Preparation Methods of Ayurvedic medicines.					
<b>UNIT - II</b>					
Definition and Method of preparation of following Ayurvedic formulations with their uses. a. Vati : Eladi vati, Lavangadi vati c. Taila: Bhringaraj taila, Shatabindu taila. d. Bhasma: Swarna bhasma, Loha bhasma e. Ghrita : Brahmi ghrita, Jhatyadi ghrita f. Asavas/Arishtas: Chandan asava, Dashamoola arishta g. Lehya : Vasavalehya, Kusumandavalehya					
<b>UNIT - III</b>					
Naturopathy and Yoga practices: a) Naturopathy - Introduction, basic principles and treatment modalities. b) Yoga - Introduction and Streams of Yoga. Asanas, Pranayama, Meditations and Relaxation techniques.					
<b>UNIT - IV</b>					
a) A brief History, Origin and development of Homeopathy. Fundamentals, concepts and Principles of Homeopathy. Introduction to different dosage forms and method of preparation of Homeopathic medicines. b) Siddha systems of medicines, their merits and demerits					
<b>UNIT - V</b>					
a) Principles of Unani and. Introduction to different dosage forms and method of preparations of Unani medicines. b) Aromatherapy – Introduction, aroma oils for common problems, carrier oils.					
<b>Textbooks:</b>					
TEXT BOOKS: 1. Standardization by Botanicals by V.Rajpal , Vol1 , Eastern Publishers New Delhi 2. Healing plants of peninsular India by Parrota CABI Publications. 3. Principles of integrated medicines by Mathur PR 4. Principles and Practice of Homeopathy by Dr. M. L. Dhawale 5. The Complete Book of Essential Oils and Aromatherapy by Valerie Ann Worwood 6. Handbook on Unani Medicines with Formulae, Processes, Uses and Analysis					
<b>Reference Books:</b>					



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**COURSE STRUCTURE & SYLLABI**

- 1) Ayurvedic formulary of India, Govt. of India
- 2) Homeopathic Pharmacopoeia
- 3) Unani Medical Systems
- 4) Pharmacopoeial standards for Ayurvedic formulations CCRAS, Delhi
- 5) Ayurvedic pharmacopoeia
- 6) Indian herbal pharmacopoeia vol.1 & 2 RRL, IDMA
- 7) Vaidya Yoga Ratnavali (Formulary of Ayurvedic Medicines)
- 8) Ayurvedic drugs and their plant sources by VV. Sivarajan
- 9) Augmented textbook of Homeopathic Pharmacy by Dr. D. D. Benerjee
- 10) Yoga - The Science of Holistic Living by V.K. Yoga, Vivekananda Yoga Prakashna Publishing, Bangalore.
- 11) Homeopathic Pharmacopoeia. Formulary of Homeopathic Medicines, IMCOPS, Chennai.



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## M.PHARM. IN PHARMACOGNOSY

## COURSE STRUCTURE

Course Code	NEUTRACEUTICALS AND HERBAL COSMETICS	L	T	P	C
21S06203		4	0	0	4
Semester		II			
Course Objectives:					
Objectives: The topics helps the students to get exposed to processes involved in the manufacturing of herbal cosmetics including the skin and hair care herbal products preparation and their evaluation.					
Course Outcomes (CO): Student will be able to					
The students will expose to characteristic features of various phytochemicals as neutraceuticals in various diseased conditions and also know the role of antioxidant in free radical induced disease conditions and will expose to various food laws and regulations. Scientific knowledge to develop nutraceuticals and herbal cosmetics with desired Safety, stability, and efficacy.					
UNIT - I		12Hrs			
a) Definitions of Functional foods, Nutraceuticals and Dietary supplements. Classification of Nutraceuticals, Health problems and diseases that can be prevented or cured by Nutraceuticals i.e. weight control, diabetes, cancer etc. b) Source, Name of marker compounds and their chemical nature, Medicinal uses and health benefits of following used as Nutraceuticals / functional foods: Spirulina, Soyabean, Ginseng, Garlic, Broccoli, Gingko, Flaxseeds					
UNIT - II		12Hrs			
Phytochemicals as neutraceuticals: Occurrence and characteristic features(chemical nature medicinal benefits) of following a) Carotenoids- $\alpha$ and $\beta$ -Carotene, Lycopene, Xanthophylls, lutein b) Sulfides: Diallylsulfides, Allyltrisulfide. c) Polyphenolics: Resvervetrol d) Flavonoids- Rutin, Naringin, Quercitin, Anthocyanidins, catechins, Flavones e) Prebiotates / Probiotics: Fructo oligosaccharides, Lacto bacillum f) Phytoestrogens : Isoflavones, daidzein, Geebustin, lignans g) Tocopherols					
UNIT – III					
a) Introduction to free radicals: Free radicals, reactive oxygen species, production of Free radicals in cells, damaging reactions of free radicals on lipids, proteins, Carbohydrates, nucleic acids. b) Measurement of free radicals: Lipid peroxidation products, lipid hydroperoxide, malondialdehyde. c) Antioxidants: Endogenous antioxidants – enzymatic and nonenzymatic antioxidant defence, Superoxide dismutase, catalase, Glutathione peroxidase, Glutathione Vitamin C, Vitamin E, $\alpha$ - Lipoic acid, melatonin Synthetic antioxidants : Butylatedhydroxy Toluene, Butylatedhydroxy Anisole.					
UNIT – IV		12Hrs			
Cosmoceuticals of herbal and natural origin: Hair growth formulations, Shampoos, Conditioners, Colorants & hair oils, Fairness formulations, vanishing & foundation creams, anti-sunburn preparations, moisturizing creams, deodorants. Analysis of Cosmetics, Toxicity screening and test methods: Quality control and toxicity studies as per Drug and Cosmetics Act.					
UNIT – V		12Hrs			
Food Laws and Regulations; FDA, FPO, MPO, AGMARK. HACCP and GMPs on Food Safety. Adultration of foods.					



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**COURSE STRUCTURE & SYLLABI**

Regulations and Claims – Current Products: Label Claims, Nutrient Content Claims, Health Claims, Dietary Supplements Claims
<b>Textbooks:</b>
1) Advanced Nutritional Therapies by Cooper. K.A., (1996). 2) The Food Pharmacy by Jean Carper, Simon & Schuster, UK Ltd., (1988). 3) Handbook of Nutraceuticals and Functional Foods, Third Edition (Modern Nutrition) 4) Herbal Cosmetics Hand Book- H. Panda 5) Herbal Cosmetics by P.K Chattopadhyay 6) The Complete Technology Book on Herbal Perfumes and Cosmetics by H. Panda 7) Supriya K B. Handbook of Aromatic Plants, Pointer Publishers, Jaipur.
<b>Reference Books:</b>
1. Dietetics by Sri Lakshmi 2. Role of dietary fibres and nutraceuticals in preventing diseases by K.T Agusti and P.Faizal: BSPublication. 3. Prescription for Nutritional Healing by James F.Balch and Phyllis A.Balch 2nd Edn., Avery Publishing Group, NY (1997). 4. G. Gibson and C. Williams Editors 2000 Functional foods Woodhead Publ. Co. London. 5. Goldberg, I. Functional Foods. 1994. Chapman and Hall, New York. 6. Labuza, T.P. 2000 Functional Foods and Dietary Supplements: Safety, Good Manufacturing Practice (GMPs) and Shelf Life Testing in Essentials of Functional Foods M.K. Sachmidl and T.P. Labuza eds. Aspen Press. 7. Shils, ME, Olson, JA, Shike, M. 1994 Modern Nutrition in Health and Disease. Eighth edition. Lea and Febiger 8. Cosmetics- Formulation, Manufacturing and Quality control –P.P.Sharma 9. Skaria P. Aromatic Plants (Horticulture Science Series), New India Publishing Agency, New Delhi. 10. Kathi Keville and Mindy Green. Aromatherapy (A Complete Guide to the Healing Art), Sri Satguru Publications, New Delhi. 11. Chattopadhyay PK. Herbal Cosmetics & Ayurvedic Medicines (EOU), National Institute of Industrial Research, Delhi. 12. Balsam MS & Edward Sagarin. Cosmetics Science and Technology, Wiley Interscience, New York.





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## M.PHARM. IN PHARMACOGNOSY

### COURSE STRUCTURE

Course Code	MEDICINAL PLANT BIOTECHNOLOGY	L	T	P	C
21S06204		4	0	0	4
Semester		II			
<b>Course Objectives:</b>					
Upon completion of the course, the student shall be able to, <ul style="list-style-type: none"><li>Know the process like genetic engineering in medicinal plants for higher yield of Phytopharmaceuticals.</li><li>Use the biotechnological techniques for obtaining and improving the quality of natural products/medicinal plants</li></ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
To explore the knowledge of Biotechnology and its application in the improvement of quality of medicinal plants					
<b>UNIT - I</b>					
Introduction to Plant biotechnology: Historical perspectives, prospects for development of plant biotechnology as a source of medicinal agents. Applications in pharmacy and allied fields. Genetic and molecular biology as applied to pharmacognosy, study of DNA, RNA and protein replication, genetic code, regulation of gene expression, structure and complicity of genome, cell signaling, DNA recombinant technology.					
<b>UNIT - II</b>					
Different tissue culture techniques: Organogenesis and embryogenesis, synthetic seed and monoclonal variation, Protoplast fusion, Hairy root multiple shoot cultures and their applications. Micro propagation of medicinal and aromatic plants. Sterilization methods involved in tissue culture, gene transfer in plants and their applications.					
<b>UNIT – III</b>					
Immobilisation techniques & Secondary Metabolite Production: Immobilization techniques of plant cell and its application on secondary metabolite Production. Cloning of plant cell: Different methods of cloning and its applications. Advantages and disadvantages of plant cell cloning. Secondary metabolism in tissue cultures with emphasis on production of medicinal agents. Precursors and elicitors on production of secondary metabolites.					
<b>UNIT – IV</b>					
Biotransformation and Transgenesis: Biotransformation, bioreactors for pilot and large scale cultures of plant cells and retention of biosynthetic potential in cell culture. Transgenic plants, methods used in gene identification, localization and sequencing of genes. Application of PCR in plant genome analysis.					
<b>UNIT - V</b>					
Fermentation technology: Application of Fermentation technology, Production of ergot alkaloids, single cell proteins, enzymes of pharmaceutical interest.					
<b>Reference Books:</b>					
1. Plant tissue culture, Bhagwani, vol 5, Elsevier Publishers. 2. Plant cell and Tissue Culture (Lab. Manual), JRMM. Yeoman. 3. Elements in biotechnology by PK. Gupta, Rastogi Publications, New Delhi. 4. An introduction to plant tissue culture by MK. Razdan, Science Publishers. 5. Experiments in plant tissue culture by John HD and Lorin WR. CambridgeUniversity Press. 6. Pharmaceutical biotechnology by SP. Vyas and VK. Dixit, CBS Publishers. 7. Plant cell and tissue culture by Jeffrey W. Pollard and John M Walker. Humana press.					



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**COURSE STRUCTURE & SYLLABI**

8. Plant tissue culture by Dixon, Oxford Press, Washington DC, 1985
9. Plant tissue culture by Street.
10. Pharmacognosy by G. E. Trease and WC. Evans, Elsevier.
11. Biotechnology by Purohit and Mathur, Agro-Bio, 3rd revised edition.
12. Biotechnological applications to tissue culture by Shargool, Peter D, Shargool, CKC Press.
13. Pharmacognosy by Varo E. Tyler, Lynn R. Brady and James E. Robberrt, ThatTjen, NGO.
14. Plant Biotechnology, CiddiVeerasham.


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**COURSE STRUCTURE**

Course Code	ADVANCED PHARMACOGNOSY – II LAB	L	T	P	C
21S06205		0	0	6	3
Semester		II			
List of Experiments:					
1) Preparation and standardization of any two herbal tablets					
2) Estimation of total alkaloid content in herbal raw materials					
3) Estimation of total flavonoid content in herbal raw materials					
4) Formulation of different dosage forms and their standardization.					
5) Estimation of aldehyde and ketone in volatile oils by titrimetric methods					
6) Estimation of phenolic substances					
7) Determination of Sennoside content in Senna leaves by colorimetric analysis					
8) Determination of Withania alkaloids/steroids by colorimetric analysis					
9) Determination of moisture content, heavy metals and ash values of crude drugs					
10) Microscopical evaluation of organized powder crude drugs					
11) Screening of herbal extracts/ products for anti microbial and antifungal					
12) Screening of herbal extracts/ products for antioxidant activity by free radical scavenging methods					
13) Study of analytical profile of any two plants mentioned in theory with specialempphasis on marker compounds					



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**COURSE STRUCTURE & SYLLABI**

Course Code	NUTRACEUTICALS AND HERBAL COSMETICS	L	T	P	C
21S06206	LAB	0	0	6	3
Semester		II			
List of Experiments:					
1. Preparation of Herbarium					
2. Preparation and standardization of various simple dosage forms from Ayurvedic system.					
3. Preparation of Oral rehydration Solution (ORS)					
4. Preparation of Protein Powder					
5. Preparation of Herbal Nutraceuticals using Ginseng, Spirulina etc.					
6. Formulation of Sports food					
7. Preparation of Multivitamin formulations					
8. Preparation of herbal cosmetic formulation such as lipstick, herbal hair and nail care products					
9. Preparation of sunscreen, skin care formulations					
10. Evaluation of herbal tablets and capsules					
11. Preparation and evaluation of any two of each hair care and skin care products					
12. Preparation and Evaluation of Ascorbic acid tablets					
13. Preparation of Iron supplements					
14. Preparation and evaluation of herbal acid balanced shampoo					


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**COURSE STRUCTURE**

Course Code	RESEARCH METHODOLOGY AND INTELLECTUAL PROPERTY RIGHTS	L	T	P	C
21DRM101		4	0	0	4
Semester		III			
Course Objectives:					
Scope: <ul style="list-style-type: none"><li>To understand the research problem</li><li>To know the literature studies, plagiarism and ethics</li><li>To get the knowledge about technical writing</li><li>To analyze the nature of intellectual property rights and new developments</li><li>To know the patent rights</li></ul>					
Course Outcomes (CO): Student will be able to					
Objectives: At the end of this course, students will be able to <ul style="list-style-type: none"><li>Understand research problem formulation.</li><li>Analyze research related information</li><li>Follow research ethics</li><li>Understand that today’s world is controlled by Computer, Information Technology, but tomorrow world will be ruled by ideas, concept, and creativity.</li><li>Understanding that when IPR would take such important place in growth of individuals &amp; nation, it is needless to emphasis the need of information about Intellectual Property Right to be promoted among students in general &amp; engineering in particular.</li><li>Understand that IPR protection provides an incentive to inventors for further research work and investment in R &amp; D, which leads to creation of new and better products, and in turn brings about, economic growth and social benefits.</li></ul>					
UNIT – I					
Meaning of research problem, Sources of research problem, Criteria Characteristics of a good research problem, Errors in selecting a research problem, Scope and objectives of research problem. Approaches of investigation of solutions for research problem, data collection, analysis, interpretation, Necessary instrumentations					
UNIT – II					
Effective literature studies approaches, analysis, Plagiarism, Research ethics					
UNIT – III					
Effective technical writing, how to write report, Paper Developing a Research Proposal, Format of research proposal, a presentation and assessment by a review committee					
UNIT – IV					
Nature of Intellectual Property: Patents, Designs, Trade and Copyright. Process of Patenting and Development: technological research, innovation, patenting, development. International Scenario: International cooperation on Intellectual Property. Procedure for grants of patents, Patenting under PCT.					
UNIT – V					
Patent Rights: Scope of Patent Rights. Licensing and transfer of technology. Patent information and databases. Geographical Indications. New Developments in IPR: Administration of Patent System. New developments in IPR; IPR of Biological Systems, Computer Software etc. Traditional knowledge Case Studies, IPR and IITs.					



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**COURSE STRUCTURE & SYLLABI**

<b>Textbooks:</b>
1. Stuart Melville and Wayne Goddard, “Research methodology: an introduction for science & engineering students”
2. Wayne Goddard and Stuart Melville, “Research Methodology: An Introduction”
<b>Reference Books:</b>
1. Ranjit Kumar, 2nd Edition, “Research Methodology: A Step by Step Guide for beginners”
2. Halbert, “Resisting Intellectual Property”, Taylor & Francis Ltd ,2007.
3. Mayall, “Industrial Design”, McGraw Hill, 1992.
4. Niebel, “Product Design”, McGraw Hill, 1974.
5. Asimov, “Introduction to Design”, Prentice Hall, 1962.
6. Robert P. Merges, Peter S. Menell, Mark A. Lemley, “Intellectual Property in New
7. Technological Age”, 2016.
8. T. Ramappa, “Intellectual Property Rights Under WTO”, S. Chand, 2008



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**COURSE STRUCTURE**

# **AUDIT COURSE-I**



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**M.PHARM. IN PHARMACOGNOSY**  
**COURSE STRUCTURE & SYLLABI**

Course Code	ENGLISH FOR RESEARCH PAPER WRITING	L	T	P	C
21DAC101a		2	0	0	0
Semester		I			
<b>Course Objectives:</b> This course will enable students:					
<ul style="list-style-type: none"><li>Understand the essentials of writing skills and their level of readability</li><li>Learn about what to write in each section</li><li>Ensure qualitative presentation with linguistic accuracy</li></ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"><li>Understand the significance of writing skills and the level of readability</li><li>Analyze and write title, abstract, different sections in research paper</li><li>Develop the skills needed while writing a research paper</li></ul>					
<b>UNIT - I</b>	Lecture Hrs:10				
1Overview of a Research Paper- Planning and Preparation- Word Order- Useful Phrases - Breaking up Long Sentences-Structuring Paragraphs and Sentences-Being Concise and Removing Redundancy -Avoiding Ambiguity					
<b>UNIT - II</b>	Lecture Hrs:10				
Essential Components of a Research Paper- Abstracts- Building Hypothesis-Research Problem - Highlight Findings- Hedging and Criticizing, Paraphrasing and Plagiarism, Cauterization					
<b>UNIT - III</b>	Lecture Hrs:10				
Introducing Review of the Literature – Methodology - Analysis of the Data-Findings - Discussion- Conclusions-Recommendations.					
<b>UNIT - IV</b>	Lecture Hrs:9				
Key skills needed for writing a Title, Abstract, and Introduction					
<b>UNIT - V</b>	Lecture Hrs:9				
Appropriate language to formulate Methodology, incorporate Results, put forth Arguments and draw Conclusions					
<b>Suggested Reading</b>					
<ul style="list-style-type: none"><li>1. Goldbort R (2006) Writing for Science, Yale University Press (available on Google Books) Model Curriculum of Engineering &amp; Technology PG Courses [Volume-I]</li><li>2. Day R (2006) How to Write and Publish a Scientific Paper, Cambridge University Press</li><li>3. Highman N (1998), Handbook of Writing for the Mathematical Sciences, SIAM. Highman’sbook</li><li>4. Adrian Wallwork , English for Writing Research Papers, Springer New York Dordrecht Heidelberg London, 2011</li></ul>					





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### COURSE STRUCTURE

Course Code	DISASTER MANAGEMENT	L	T	P	C
21DAC101b		2	0	0	0
Semester		I			
Course Objectives: This course will enable students:					
<ul style="list-style-type: none"><li>Learn to demonstrate critical understanding of key concepts in disaster risk reduction and humanitarian response.</li><li>Critically evaluatedisasterriskreduction and humanitarian response policy and practice from Multiple perspectives.</li><li>Developanunderstandingofstandards ofhumanitarianresponseandpracticalrelevanceinspecific types of disasters and conflict situations</li><li>Criticallyunderstandthestrengthsandweaknessesofdisastermanagementapproaches,planningand programming in different countries, particularly their home country or the countries they work in</li></ul>					
UNIT - I					
<b>Introduction:</b> Disaster:Definition,FactorsandSignificance;DifferenceBetweenHazardandDisaster;Naturaland Manmade Disasters: Difference, Nature, Types and Magnitude. <b>Disaster Prone Areas in India:</b> Study of Seismic Zones; Areas Prone to Floods and Droughts, Landslides and Avalanches; Areas Prone to Cyclonic and Coastal Hazards with Special Reference to Tsunami; Post- Disaster Diseases and Epidemics					
UNIT - II					
<b>Repercussions of Disasters and Hazards:</b> Economic Damage, Loss of Human and Animal Life, Destruction of Ecosystem. Natural Disasters: Earthquakes,Volcanisms,Cyclones,Tsunamis,Floods,DroughtsandFamines,Landslides and Avalanches, Man-made disaster: Nuclear Reactor Meltdown, Industrial Accidents, Oil Slicks and Spills, Outbreaks of Disease and Epidemics, War and Conflicts.					
UNIT - III					
<b>Disaster Preparedness and Management:</b> Preparedness: Monitoring of Phenomena Triggering ADisasteror Hazard; Evaluation of Risk: Application of Remote Sensing, Data from Meteorological and Other Agencies, Media Reports: Governmental and Community Preparedness.					
UNIT - IV					
<b>Risk Assessment Disaster Risk:</b> Concept and Elements, Disaster Risk Reduction, Global and National Disaster Risk Situation. TechniquesofRiskAssessment,GlobalCo-OperationinRiskAssessmentand Warning, People’s Participation in Risk Assessment. Strategies for Survival.					
UNIT - V					
<b>Disaster Mitigation:</b> Meaning,ConceptandStrategiesofDisasterMitigation,EmergingTrendsInMitigation.Structural Mitigationand Non-Structural Mitigation, Programs of Disaster Mitigation in India.					
<b>Suggested Reading</b>					



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**COURSE STRUCTURE & SYLLABI**

1. R.Nishith, Singh AK, "Disaster Management in India: Perspectives, issues and strategies
2. "New Royal book  
Company.. Sahni, Pardeep Et. Al. (Eds.), "Disaster Mitigation Experiences And Reflections", Prentice Hall Of India, New Delhi.
3. Goel S.L., Disaster Administration And Management Text And Case Studies", Deep & Deep Publication Pvt. Ltd., New Delhi



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### COURSE STRUCTURE

Course Code	SANSKRITFOR TECHNICAL KNOWLEDGE	L	T	P	C
21DAC101c		2	0	0	0
Semester		I			
Course Objectives: This course will enable students:					
<ul style="list-style-type: none"><li>To get a working knowledge in illustrious Sanskrit, the scientific language in the world</li><li>Learning of Sanskrit to improve brain functioning</li><li>LearningofSanskrittodevelopthelogicinmathematics,science&amp;othersubjects enhancing the memory power</li><li>The engineering scholars equipped with Sanskrit will be able to explore the huge</li><li>Knowledge from ancientliterature</li></ul>					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"><li>Understanding basic Sanskrit language</li><li>Ancient Sanskrit literature about science &amp;technology can be understood</li><li>Being a logical language will help to develop logic in students</li></ul>					
UNIT - I					
Alphabets in Sanskrit,					
UNIT - II					
Past/Present/Future Tense, Simple Sentences					
UNIT - III					
Order, Introduction of roots					
UNIT - IV					
Technical information about Sanskrit Literature					
UNIT - V					
Technical concepts of Engineering-Electrical, Mechanical, Architecture, Mathematics					
Suggested Reading					
1.“Abhyaspustakam” –Dr.Vishwas, Sanskrit-Bharti Publication, New Delhi					
2.“Teach Yourself Sanskrit” Prathama Deeksha- VempatiKutumbshastri, RashtriyaSanskrit Sansthanam, New Delhi Publication					
3.“India’s Glorious ScientificTradition” Suresh Soni, Ocean books (P) Ltd.,New Delhi					



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**COURSE STRUCTURE & SYLLABI**

# **AUDIT COURSE-II**



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## M.PHARM. IN PHARMACOGNOSY

### COURSE STRUCTURE

Course Code	PEDAGOGY STUDIES	L	T	P	C
21DAC201a		2	0	0	0
Semester		II			
Course Objectives: This course will enable students:					
<ul style="list-style-type: none"><li>Review existing evidence on the review topic to inform programme design and policy making undertaken by the DfID, other agencies and researchers.</li><li>Identify critical evidence gaps to guide the development.</li></ul>					
Course Outcomes (CO): Student will be able to					
Students will be able to understand:					
<ul style="list-style-type: none"><li>What pedagogical practices are being used by teachers in formal and informal classrooms in developing countries?</li><li>What is the evidence on the effectiveness of these pedagogical practices, in what conditions, and with what population of learners?</li><li>How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy?</li></ul>					
UNIT - I					
Introduction and Methodology: Aims and rationale, Policy back ground, Conceptual frame work and terminology Theories of learning, Curriculum, Teacher education. Conceptual framework, Research questions. Overview of methodology and Searching.					
UNIT - II					
Thematic overview: Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries. Curriculum, Teacher education.					
UNIT - III					
Evidence on the effectiveness of pedagogical practices, Methodology for the in-depth stage: quality assessment of included studies. How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? Theory of change. Strength and nature of the body of evidence for effective pedagogical practices. Pedagogic theory and pedagogical approaches. Teachers' attitudes and beliefs and Pedagogic strategies.					
UNIT - IV					
Professional development: alignment with classroom practices and follow-up support, Peer support, Support from the head teacher and the community. Curriculum and assessment, Barrier to learning: limited resources and large class sizes					
UNIT - V					
Research gaps and future directions: Research design, Contexts, Pedagogy, Teacher education, Curriculum and assessment, Dissemination and research impact.					
Suggested Reading					
<ol style="list-style-type: none"><li>Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2): 245-261.</li><li>Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of</li></ol>					



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3. Curriculum Studies, 36 (3): 361-379.
4. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.
5. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3): 272–282.
6. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.  
Chavan M (2003) Read India: A mass scale, rapid, 'learning to read' campaign.
7. [www.pratham.org/images/resource%20working%20paper%202.pdf](http://www.pratham.org/images/resource%20working%20paper%202.pdf).


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**COURSE STRUCTURE**

Course Code	STRESSMANAGEMENT BY YOGA	L	T	P	C
21DAC201b		2	0	0	0
Semester		II			
<b>Course Objectives:</b> This course will enable students:					
<ul style="list-style-type: none"><li>To achieve overall health of body and mind</li><li>To overcome stres</li></ul>					
<b>Course Outcomes (CO):</b> Student will be able to					
<ul style="list-style-type: none"><li>Develop healthy mind in a healthy body thus improving social health also</li><li>Improve efficiency</li></ul>					
<b>UNIT - I</b>					
Definitions of Eight parts of yog.(Ashtanga)					
<b>UNIT - II</b>					
Yam and Niyam.					
<b>UNIT - III</b>					
Do`sand Don`t`s in life. i) Ahinsa,satya,astheya,bramhacharyaand aparigrahaii) Shaucha,santosh,tapa,swadhyay,ishwarpranidhan					
<b>UNIT - IV</b>					
Asan and Pranayam					
<b>UNIT - V</b>					
i)Variousyogposesand theirbenefitsformind &body ii)Regularizationofbreathingtechniques and its effects-Types ofpranayam					
<b>Suggested Reading</b>					
1.‘Yogic Asanas forGroupTarining-Part-I’: Janardan SwamiYogabhyasiMandal, Nagpur 2.“Rajayogaor conquering the Internal Nature” by Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata					



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**COURSE STRUCTURE & SYLLABI**

Course Code	PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS	L	T	P	C
21DAC201c		2	0	0	0
Semester		II			
Course Objectives: This course will enable students:					
<ul style="list-style-type: none"><li>To learn to achieve the highest goal happily</li><li>To become a person with stable mind, pleasing personality and determination</li><li>To awaken wisdom in students</li></ul>					
Course Outcomes (CO): Student will be able to					
<ul style="list-style-type: none"><li>Study of Shrimad-Bhagwad-Geeta will help the student in developing his personality and achieve the highest goal in life</li><li>The person who has studied Geeta will lead the nation and mankind to peace and prosperity</li><li>Study of Neetishatakam will help in developing versatile personality of students</li></ul>					
UNIT - I					
Neetisatakam- Holistic development of personality Verses-19,20,21,22(wisdom) Verses-29,31,32(pride & heroism) Verses-26,28,63,65(virtue)					
UNIT - II					
Neetisatakam- Holistic development of personality Verses-52,53,59(dont's) Verses-71,73,75,78(do's)					
UNIT - III					
Approach to day to day work and duties. Shrimad Bhagwad Geeta: Chapter 2- Verses 41,47,48, Chapter 3- Verses 13,21,27,35, Chapter 6- Verses 5,13,17,23,35, Chapter 18- Verses 45,46,48.					
UNIT - IV					
Statements of basic knowledge. Shrimad Bhagwad Geeta: Chapter 2- Verses 56,62,68 Chapter 12 - Verses 13,14,15,16,17,18 Personality of Role model. Shrimad Bhagwad Geeta:					
UNIT - V					
Chapter 2- Verses 17, Chapter 3- Verses 36,37,42, Chapter 4- Verses 18,38,39 Chapter 18- Verses 37,38,63					
Suggested Reading					
1. "Srimad Bhagavad Gita" by Swami Swarupananda Advaita Ashram (Publication Department), Kolkata 2. Bhartrihari's Three Satakam (Niti-sringar-vairagya) by P. Gopinath, Rashtriya Sanskrit Sansthanam, New Delhi.					





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**COURSE STRUCTURE**

# OPEN ELECTIVES



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**M.PHARM. IN PHARMACOGNOSY**  
**COURSE STRUCTURE & SYLLABI**

Course Code	BIOLOGICAL SCREENING METHODS ( Elective)	L	T	P	C
21SOE301d		3	0	0	3
Semester		III			
Course Objectives:					
The students are going to study about various techniques for screening of drugs for various pharmacological activities and guide lines for handling animals and human and animal ethics for screening of drugs.					
Course Outcomes (CO): Student will be able to					
The expected outcomes are students will know how to handle animals and know about various techniques for screening of drugs for different pharmacological activities, guidelines and regulations for screening new drug molecules on animals.					
UNIT - I					
Drug discovery process: Principles, techniques and strategies used in new drug discovery. High throughput screening, human genomics, robotics and economics of drug discovery, Regulations. Alternatives to animal screening procedures, cell-line, patch –clamp technique, In-vitro models, molecular biology techniques.					
UNIT - II					
Bioassays: Basic principles of bioassays, official bioassays, experimental models and statistical designs employed in biological standardization.					
UNIT - III					
Principles of toxicity evaluations, ED50, LD50 and TD values, International guidelines (ICH recommendations). Preclinical studies: General principles and procedures involved in acute, sub-acute, chronic, teratogenicity, mutagenicity and carcinogenicity.					
UNIT - IV					
Screening of different classes of drugs using micro-organisms. Vitamin and antibiotic assays. Screening methods involved in toxins and pathogens.					
UNIT - V					
Enzymatic screening methods: $\alpha$ -glucosidase, $\alpha$ - amylase, DNA polymerase, nucleases, Laspariginase, lipases and peptidases.					
Reference Books:					
1. Basic and clinical pharmacology by Bertram G. Katzung (International edition) lange medical book / Mc Graw Hill, USA 2001 8th edition					
2. Pharmacology by Rang H.P, Dale MM and Ritter JM., Churchill Livingston, London, 4/e					
3. Goodman and Gilman’s The pharmacological basis of therapeutics (International edition) Mc Graw Hill, USA 2001 10th edition.					
4. General and applid toxicology by B.Ballantyne, T.Marrs, P.Turner (Eds) The Mc Millan press Ltd, London.					
5. Drug Discovery by Vogel’s					
6. Drug Discovery and evaluation – Pharmacological assays by H.Gerhard.Vogel, 2nd edition, Springer verlag, Berlin, Heidelberg.					
7. Tutorial Pharmacy (Vol I and II) by Cooper and Gunns.					



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### COURSE STRUCTURE

Course Code	PHARMACEUTICAL VALIDATION (Elective)	L	T	P	C
21SOE301a		3	0	0	3
Semester		III			
Course Objectives:					
Course Objective: The main purpose of the subject is to understand about validation and how it can be applied to industry and thus to improve the quality of the products. The subject covers the complete information about validation, types, methodology and application.					
Course Outcomes (CO): Student will be able to					
Upon completion of the subject student shall be able to					
<ul style="list-style-type: none"><li>• Explain the aspect of validation</li><li>• Carryout validation of manufacturing processes</li><li>• Apply the knowledge of validation to instruments and equipments</li><li>• Validate the manufacturing facilities</li></ul>					
UNIT - I					
Introduction: Definition of Qualification and Validation, Advantage of Validation, Streamlining of Qualification & Validation process and Validation Master Plan. Qualification: User Requirement Specification, Design Qualification, Factory Acceptance Test (FAT)/ Site Acceptance Test (SAT), Installation Qualification, Operational Qualification, Performance Qualification, Re- Qualification (Maintaining status -Calibration Preventive Maintenance, Change management), Qualification of Manufacturing Equipment, Qualification of Analytical Instruments and Laboratory equipments.					
UNIT – II					
Qualification of analytical instruments: Electronic balance, pH meter, UV-Visible spectrophotometer, FTIR, GC, HPLC, HPTLC					
Qualification of Glassware: Volumetric flask, pipette, Measuring cylinder, beakers and burette.					
UNIT - III					
Qualification of laboratory equipments: Hardness tester, Friability test apparatus, tap density tester, Disintegration tester, Dissolution test apparatus.					
Validation of Utility systems: Pharmaceutical water system & pure steam, HVAC system, Compressed air and nitrogen.					
UNIT - IV					
Cleaning Validation: Cleaning Validation - Cleaning Method development, Validation and validation of analytical method used in cleaning. Cleaning of Equipment. Cleaning of Facilities. Cleaning in place (CIP).					
UNIT - V					
Analytical method validation: General principles, Validation of analytical method as per ICH guidelines and USP.					
Textbooks:					
1. T. Loftus & R. A. Nash, "Pharmaceutical Process Validation", Drugs and Pharm Sci. Series, Vol.129, 3rd Ed., Marcel Dekker Inc., N.Y.					
2. The Theory & Practice of Industrial Pharmacy, 3rd edition, Leon Lachman, Herbert A. Lieberman, Joseph. L. Karig, Varghese Publishing House, Bombay.					
3. Validation Master plan by Terveeks or Deeks, Davis Harwood International publishing.					
4. Validation of Aseptic Pharmaceutical Processes, 2nd Edition, by Carleton & Agalloco, (Marcel Dekker).					
5. Michael Levin, Pharmaceutical Process Scale-Up, Drugs and Pharm. Sci. Series, Vol. 157, 2 <sup>nd</sup> Ed., Marcel Dekker Inc., N.Y.					



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**COURSE STRUCTURE & SYLLABI**

Course Code	ENTREPRENEURSHIP MANAGEMENT	L	T	P	C
21SOE301c	( Elective)	3	0	0	3
Semester		III			
<b>Course Objectives:</b>					
This course is designed to impart knowledge and skills necessary to train the students on entrepreneurship management.					
<b>Course Outcomes (CO):</b> Student will be able to					
On completion of this course it is expected that students will be able to:					
<ul style="list-style-type: none"><li>• The Role of enterprise in national and global economy</li><li>• Dynamics of motivation and concepts of entrepreneurship</li><li>• Demands and challenges of Growth Strategies and Networking</li></ul>					
UNIT - I					
Conceptual Frame Work: Concept need and process in entrepreneurship development. Role of enterprise in national and global economy. Types of enterprise – Merits and Demerits. Government policies and schemes for enterprise development. Institutional support in enterprise development and management					
UNIT - II					
Entrepreneur: Entrepreneurial motivation – dynamics of motivation. Entrepreneurial competency – Concepts. Developing Entrepreneurial competencies - requirements and understanding the process of entrepreneurship development, self-awareness, interpersonal skills, creativity, assertiveness, achievement, factors affecting entrepreneur role.					
UNIT – III					
Launching and Organizing an Enterprise: Environment scanning – Information, sources, schemes of assistance, problems. Enterprise selection, market assessment, enterprise feasibility study, SWOT Analysis. Resource mobilization -finance, technology, raw material, site and manpower. Costing and marketing management and quality control. Feedback, monitoring and evaluation.					
UNIT – IV					
Growth Strategies and Networking: Performance appraisal and assessment. Profitability and control measures, demands and challenges. Need for diversification. Future Growth – Techniques of expansion and diversification, vision strategies. Concept and dynamics. Methods, Joint venture, coordination and feasibility study.					
UNIT – V					
Preparing Project Proposal to Start on New Enterprise Project work – Feasibility report; Planning, resource mobilization and implementation.					
<b>Reference Books:</b>					
<ul style="list-style-type: none"><li>1. Akhauri, M. M. P.(1990): Entrepreneurship for Women in India, NIESBUD, New Delhi.</li><li>2. Hisrich, R. D &amp; Brush, C.G. (1996) The Women Entrepreneurs, D.C. Health&amp; Co., Toranto.</li><li>3. Hisrich, R.D. and Peters, M.P. (1995): Entrepreneurship – Starting Developing and Managing a New Enterprise, Richard D., Inwin, INC, USA.</li><li>4. Meredith, G.G. etal (1982): Practice of Entrepreneurship, ILO, Geneva.</li><li>5. Patel, V.C. (1987): Women Entrepreneurship – Developing New Entrepreneurs, Ahmedabad EDII</li><li>6. Arya kumar.(2012): Entrepreneurship- Creating and Leading an Entrepreneurial Organization, Pearson</li></ul>					