

CURRICULUM

DIPLOMA

Ayurveda Pharmacy



Council for Technical Education and Vocational Training
Curriculum Development Division

Sanothimi, Bhaktapur

2018

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Introduction

This 3 years Diploma in Ayurveda Pharmacy curricular programme is designed for producing skilled Ayurveda pharmacy personnel equipped with knowledge and skills of Ayurveda dispensaries and pharmacy with a view to provide curative, preventive and promotive health services to the community. It is based on code of conduct of Nepal Ayurveda Medical Council.

The course of Diploma in Ayurveda Pharmacy primarily deals in drugs and its medications used in Ayurveda as a field of medicine. The program extends over three years having theoretical and practical parts. The first year courses focus on the basic sciences and foundational subjects similar to all health PCL/diploma programs, the second year focus on the core subjects of Ayurveda pharmacies, and the third year is given to the core subjects and the application of learned theory practically in comprehensive field practice in both hospital and community. It focuses on manufacturing and consumer sector of drugs such as ayurvedic formulations, Ayurveda drug manufacturing, quality control, drug store management, drug dispensing, modern and traditional manufacturing techniques as well as Ayurveda raw materials under various subjects. Apart from this, they are also rendered additional knowledge through seminars, discussions, case studies, and presentations. This course is based on the job required to perform by Assistant Ayurveda Pharmacist.

Rational

Courses of Diploma in Ayurveda Pharmacy is a new course in Nepal. Ayurveda pharmacies have been running without Ayurveda Pharmacist in Nepal. Ayurvedic Pharmacies have been recently reinforced and there's increased craze for herbal products worldwide due to global acceptance of Ayurveda. It is one of the latest fields with a huge market potential & its growth as a breeding ground for earning foreign exchange. Recently, pharmaceutical industries, drug authority and academic institutions felt the necessity of curriculum of Ayurveda Pharmacy because of very few skilled pharmacists servicing in public & private Ayurveda pharmaceutical sectors. It is necessary to develop specialized workforce in Ayurveda for manufacturing & dispensing in Ayurvedic pharmacies. More-over self-employment is the need of the day & that's why diploma courses of Ayurveda pharmacies are in demand. There is a provision of pharmacist in herbaceutical industry in DDA (Department of drug administration) guidelines of good manufacturing process (GMP) of drug but due to lack of Ayurveda Pharmacists, the herbaceutical industry is seriously facing problem. The graduates of diploma in Ayurveda Pharmacy will fulfil such lacking.

Graduates of Diploma in Ayurveda Pharmacy have career opportunities in the areas of Ayurveda hospitals, private Pharmacies, Ayurveda and herbal pharmaceutical industries, colleges, universities and much more. The course aims to build the candidates with the knowledge of the sector by making them expertise in Ayurvedic drugs and for taking up higher educational programs.

Curriculum Title:

Diploma in Ayurveda Pharmacy

Aim

This program aims to produce skilled middle level technical workforce of Ayurveda Pharmacy equipped with knowledge and skills of dispensaries and pharmacy.

Programme Objectives

After completion of this course graduates will be able to:

1. Identify and resolve community health problems by applying principle of Ayurveda and modern medicines.
2. Dispense ayurvedic drugs at hospitals and dispensaries.
3. Carryout work at ayurveda health institutions, hospitals or at pharmaceutical /herbaceutical companies as Ayurveda Pharmasist.
4. Describe the Ras, Guna, Biryas, Vipak, properties, proportion, composition, doses and rational use of ayurvedic drugs
5. Become self-employed in a Ayurveda Pharmacy
6. Be instilled with the fundamental principles of Ayurveda and its uses in treating different ailments.

Group Size

The group size will be maximum of 40 (Forty) students in a batch.

Entry criteria

- SLC pass or SEE with GPA 2.00 plus minimum C grade in compulsory Mathematics, English & Science after letter grading system.
- TSLC in relevant discipline with minimum 67.00%.

Course Duration

The **Diploma in Ayurveda pharmacy** program extends over three academic years. It is a yearly program. One academic year consists of maximum of 39 academic weeks excluding evaluation periods and one academic week consists of maximum of 40 hrs.

Medium of Instruction:

The medium of instruction will be in English and/or Nepali.

Pattern of Attendance:

Minimum of 90% attendance in each subject is required to appear in the respective final examination.

Teacher and Student Ratio

- Overall ratio of teacher and student must be 1:10 (at the institution level)
- For theory:- 1:40
- For practical/lab/demonstration:- 1:10
- 75% of the teachers must be full timer.

Qualification of Teachers and Instructors:

- The program coordinator and foundational subject related teacher should be master degree holder in the related area.
- The disciplinary subject related Instructors and Demonstrators should be a bachelor's degree holder in the related area.

Instructional Media and Materials:

The following instructional media and materials are suggested for the effective instruction and demonstration.

- **Printed Media Materials:** Assignment sheets, handouts, information sheets, individual training packets, performance checklists, textbooks etc.).
- **Non-projected Media Materials:** Display, models, flip chart, poster, writing board etc.
- **Projected Media Materials:** Opaque projections, overhead transparencies, slides etc.
- **Audio-Visual Materials:** Audiotapes, films, slide-tape programmes, videodiscs, videotapes etc.
- **Computer-Based Instructional Materials:** Computer-based training, interactive video etc.

Teaching Learning Methodologies:

The methods of teachings for this curricular program will be a combination of several approaches such as; illustrated lecture, tutorial, group discussion, demonstration, simulation, guided practice, fieldwork, block study, industrial practice, report writing, term paper presentation, heuristic and other independent learning exercises.

Theory: Lecture, discussion, interaction, illustrated talks, tutorial, assignment, group discussion, demonstration , group work etc.

Practical: Demonstration, observation, guided practice, self-practice, simulation, project work, field work, real practice, industrial practice, hospital practice, report writing, term paper presentation, etc.

Mode of Instruction

Mainly inductive or both deductive and inductive mode will be applied.

Examination and Marking Scheme

a. Internal assessment

- There will be a evaluation system for each subject both in theory and practical exposure.
- Each subject will have internal assessment at regular intervals and students will get the feedback about it.
- Weightage of theory and practical marks are mentioned in course structure.
- Continuous assessment format will be developed and applied by the evaluators for evaluating student's performance in the subjects related to the practical experience.

b. Final examination

- Weightage of theory and practical marks are mentioned in course structure.
- Students must pass in all subjects both in theory and practical for certification. If a student becomes unable to succeed in any subject, s/he will appear in the re-examination administered by CTEVT.

- Students will be allowed to appear in the final examination only after completing the internal assessment requirements.

c. Requirement for final practical examination

- Qualified Ayurveda Pharmacist/relevant subject teacher must evaluate final practical examinations.
- One evaluator in one setting can evaluate not more than 20 students.
- Practical examination should be administered in actual situation on relevant subject with the provision of at least one internal evaluator from the concerned or affiliating institute led by external evaluator nominated by CTEVT.
- Provision of re-examination will be as per CTEVT policy.

d. Final practicum evaluation will be based on:

- Institutional practicum attendance - 10%
- Logbook/Practicum book maintenance - 10%
- Spot performance (assigned task/practicum performance/identification/arrangement preparation/measurement) - 40%
- Viva voce :
 - Internal examiner - 20%
 - External examiner - 20%
 -

e. Pass marks:

- The students must secure minimum 40% marks in theory and 50% marks in practical. Moreover, the students must secure minimum pass marks in the internal assessment and in the semester final examination of each subject to pass the subject.

Provision of Back Paper

There will be the provision of back paper but a student must pass all the subjects of all years within six years from the enrollment date.

Disciplinary and Ethical Requirements

- Intoxication, insubordination or rudeness to peers will result in immediate suspension followed by the review of the disciplinary review committee of the institute.
- Dishonesty in academic or practical activities will result in immediate suspension followed by administrative review, with possible expulsion.
- Illicit drug use, bearing arms in institute, threats or assaults to peers, faculty or staff will result in immediate suspension, followed by administrative review with possible expulsion.

Grading System

The following grading system will be adopted:

- ❖ Distinction: 80% or above
- ❖ First division: 65% to below 80%
- ❖ Second division: 50% to 65%
- ❖ Pass division: Pass aggregate to below 50%

Certification and Degree Awards

- Students who have passed all the components of all subjects of all 3 years are considered to have successfully completed the program.
- Students who have successfully completed the program will be awarded with a degree of " **Diploma in Ayurveda Pharmacy**".

Career Opportunity

The graduates of Diploma in Ayurveda Pharmacy will be eligible for the position equivalent to Non-gazetted 1st class/level 5 (technical) as "Assistant Ayurveda Pharmacist " or as prescribed by the Public Service Commission or the concerned authorities of Nepal. The graduates will be eligible for registration with the Nepal Ayurveda Medical Council in the category as mentioned in the Act of the Council.

Question Patterns for Written Exam

The question patterns for written exam are suggested as follows;

A. For subject with full marks 80

S. N.	Type of question	No of question	Weightage of marks	Full marks	Time distribution	Optional questions
1	Long	3	8	24	54 min	1
2	Short	8	4	32	72 min	2
3	Very short	12	2	24	54 min	2
	Total	23		80	180 min	

B. For subject with full marks 60

S. N.	Type of question	No of question	Weightage of marks	Full marks	Time distribution	Optional questions
1	Long	3	6	18	54 min	1
2	Short	8	3	24	72 min	2
3	Very short	9	2	18	54 min	2
	Total	20		60		

C. For subject with full marks 40

	Type of question	No of question	Weightage of marks	Full marks	Time distribution	Optional questions
1	Long	2	6	12	27	1
2	Short	4	4	16	36	1
3	Very short	6	2	12	27	1
	Total	12		40	90	

Course structure for Diploma in Ayurveda- Pharmacy

First Year

S N	Subjects	Mode			Distribution of Marks						Total Marks
					Theory			Practical			
		T	P	Total	Internal	Final	Exam Hour	Internal	Final	Exam Hour	
1	English	3	0	3	20	80	3	-	-	-	100
2	Nepali	3	0	3	20	80	3	-	-	-	100
3	Social Studies	2	0	2	10	40	1.5	-	-	-	50
4	Anatomy & Physiology	4	1	5	20	60	3	10	10	3	100
5	Physics	4	2	6	20	60	3	10	10	3	100
6	Chemistry	4	2	6	20	60	3	10	10	3	100
7	Zoology	3	2	5	20	60	3	10	10	3	100
8	Botany	3	2	5	20	60	3	10	10	3	100
9	Mathematics & Statistics	4	1	5	20	60	3	10	10	3	100
Total		30	10	40	170	560		60	60		850

Second year

S N	Subjects	Mode			Distribution of Marks						Total Marks
					Theory			Practical			
		T	P	Total	Internal	Final	Exam Hour	Internal	Final	Exam Hour	
1	Sanskrit	2	-	2	10	40	1.5	-	-	-	50
2	Maulika Siddhanta tatha Shareera	3	1	4	15	60	3	10	15	2	100
3	Dravyaguna Vigyan I	3	3	6	15	60	3	30	45	2	150
4	Rasashastra tatha Bhaishajya Kalpana I	2	4	6	10	40	1.5	40	60	4	150
5	Pharmaceutical Chemistry	2	2	4	10	40	1.5	20	30	2	100
6	Biochemistry and Microbiology	3	1	4	15	60	3	10	15	2	100
7	Pharmacognosy	3	2	5	15	60	3	20	30	2	125
8	Health Education and Health Care Systems	3	1	4	15	60	3	10	15	2	100
9	Pharmaceutical Technology	3	2	5	15	60	3	20	30	2	125
Total		24	16	40	120	480		160	240		1000

Third Year

S N	Subjects	Mode			Distribution of Marks						Total Marks
					Theory			Practical			
		T	P	Total	Internal	Final	Exam Hours	Internal	Final	Exam Hours	
A. Training Center Based Programme : 30 Weeks											
1	Dravyaguna Vigyan II	4	5	9	10	40	1.5	40	60	4	150
2	Rasashastra tatha Bhaishajya Kalpana II	4	5	9	10	40	1.5	40	60	4	150
3	Pharmaceutical Management	3	2	5	10	40	1.5	20	30	2	100
4	Hospital and Clinical Pharmacy	3	2	5	10	40	1.5	20	30	2	100
5	Social Pharmacy, Pharmaceutical Jurisprudence and Toxicology	3	2	5	10	40	1.5	20	30	2	100
6	Roga Nidhan Tatha Chikitsa	4	2	6	10	40	1.5	20	30	2	100
	Sub Total	21	18	39	60	240		160	240		700
B. Field Based Programme : 10 Weeks											
1	Comprehensive Professional Field Practice		40	40							300
Total											1000

First Year

(Please see separate curriculum for General Health Science First Year all)

Second Year

Subjects:

1. Sanskrit
2. Maulik Siddhanta tatha Shareera
3. Drabyaguna vigyana and pharmacology
4. Rasa Shastra tatha Bhaisajya Kalpana
5. Pharmaceutics chemistry
6. Biochemistry and Microbiology
7. Pharmacognosy
8. Health Education and Health Care Systems
9. Phamacdiceutical Technology for Ayurvedic Drugs

संस्कृत (Sanskrit)

पाठ्यभारः २ घण्टा/हप्ता
सैद्धान्तिकः ७८ घण्टा

पूर्णाङ्कः ५०

पाठ्यवस्तुको विवरण :

यस पाठ्यांश अन्तर्गत विद्यार्थीहरूले संस्कृत व्याकरण, वाक्य रचना तथा आयुर्वेद सुभाषित साहित्य, अमरकोष एवं हितोपदेशको अध्ययन गर्नेछन् ।

पाठ्यक्रमको उद्देश्य :

यो पाठ्यांश पढिसकेपछि विद्यार्थीहरू निम्न बमोजिम विषयवस्तुहरू अध्ययन गर्न र भन्न एवं लेख्न सक्नेछन् :

- संस्कृतका स्वर तथा व्यञ्जन वर्णको परिचय दिन ।
- नाम, आख्यात, उपसर्ग र निपातको अध्ययन / प्रयोग गर्न ।
- नाम : सन्धि, सुबन्त पद (लिङ्ग, वचन, विभक्ति) को प्रयोग गर्न ।
- कारक, समास र कृत्, तद्धित र स्त्रीप्रत्ययहरूको अध्ययन र प्रयोग गर्न ।
- आख्यात (तिङन्त) को अध्ययन र प्रयोग ।
- उपसर्ग र निपात (अव्यव सहित) को अध्ययन र प्रयोग ।
- संस्कृत भाषामा वाक्य रचना र वाक्यान्तरण पद्धतिको अध्ययन र प्रयोग ।
- वैद्यकीयसुभाषित साहित्य, अमरकोष (वनौषधिवर्ग) र हितोपदेशको सामान्य ज्ञानका साथै आयुर्वेदका मौलिक ग्रन्थ तथा तिनका संस्कृतटीकाहरूको परिचय ।

एकाई १ : व्याकरण खण्ड

२५ घण्टा

१.१ संस्कृतका स्वर वर्ण र व्यञ्जन वर्णको परिचय

- (क) संस्कृतका १४ वटा स्वर वर्णको स्थान र प्रयत्नको अध्ययन र प्रयोग
- (ख) संस्कृतका ३३ व्यञ्जन वर्णहरूको स्थान र प्रयत्नको अध्ययन र प्रयोग
- (ग) आवश्यक प्रत्याहारको सामान्य जानकारी

१.२ संस्कृत नामको अध्ययन

१.२.१ निम्न सन्धिको अध्ययन र प्रयोग

- (क) अच्सन्धि (ख) हल्सन्धि (ग) विसर्गसन्धि

१.२.२ सुबन्त पदको अध्ययन र प्रयोग

लिङ्ग, वचन र विभक्तिको अध्ययन र निर्धारित शब्दहरूको रूपावली, तिनको निर्माण प्रक्रियाको जानकारी ।

(क) अजन्त (स्वरान्त) शब्द

अजन्त-पुलिङ्ग - राम, हरि, भानु, पितृ ।

अजन्त-स्त्रीलिङ्ग - रमा, नदी, धेनु, मातृ ।

अजन्त-नपुंसकलिङ्ग - फल, वारि, मधु ।

(ख) हलन्त (व्यञ्जान्त) शब्द

हलन्त-पुलिङ्ग - राजन्, महत्

हलन्त-स्त्रीलिङ्ग - पुर्

हलन्त-नपुंसकलिङ्ग - मनस्

(ग) सर्वनाम शब्दहरू - सर्व युष्मद्, अष्मद्, इदम्, अदस्, किम्, तत् (तीनैलिङ्गमा) ।

१.३ उपसर्ग र निपात (अव्यय) शब्दहरूको परिचय, अर्थको ज्ञान र प्रयोग ।

(क) उपसर्ग - प्र, परा, अप, सम्, अनु, अव, निस्, निर, दुस्, दुर, वि, आड, नि, अधि, अपि, अति, सु, उत्, अभि, प्रति, परि, उप ।

(ख) निपात (अव्यय) शनैः, स्वतः, अद्य, अतः, अधः, इव, पुनः, प्रातः, यथा, सहसा, पृथक्, भूयोभूयः, बहिः, भृशम्, सह, पश्चात्, सहसा

१.४ आख्यात (तिङन्तपद) - लकार र तिङन्त विभक्तिको परिचय, काल, पुरुष, र वचनको जानकारी, सकर्मक, अकर्मक, परस्मैपदी, आत्मनेपदी र उभयपदी धातुको परिचय । निम्नलिखित धातुहरूका लट्, लृट्, लोट् र लङ् लकारका रूपहरू -

भ्वादि - भू, गम्, दृश्, पा, घ्रा, वद्, श्रु, लभ्, वह, नी ।

अदादि - हन्, विद्, शीङ्, अद्, पा ।

जुहोत्यादि - हु, दा, भी ।

दिवादि - सिव्, नृत् ।

श्वादि - सु, चि ।

तुदादि - तुद्, मिल्, इष्, पृच्छ् ।

रुधादि - भिद्, भुज् ।

तनादि - क्, तन् ।

ऋचादि - क्री, ज्ञा ।

चुरादि - चुर, कथ्, चिति ।

१.५. कारक, समासर विभिन्न प्रत्ययहरूको अध्ययन र प्रयोग ।

(क) कारक र विभक्तिको अध्ययन र प्रयोग ।

(ख) समासको परिचय, प्रकार, शब्द निर्माण र प्रयोग ।

(ग) कृत् प्रत्ययको अध्ययन । निम्न लिखित प्रत्ययबाट बनेका शब्दहरूको ज्ञान र प्रयोग :

तव्यत्, अनीयर्, यत्, ण्वुल्, तृच्, अण्, तुमुन्, क्तिन्, क्त्वा, ल्यप्, क्त, क्तवत् ।

(घ) तद्धित प्रत्ययहरूको अध्ययन । निम्नलिखित प्रत्ययहरूको योगले बनेका शब्दहरूको ज्ञान र प्रयोग :

अण्, ण्य, फ, ढक्, ठक्, त्व, तल्, मयट्, इन्, त्रल्, तरप्, तमप्, च्वि, ख, छ ।

(ङ) निम्न लिखित स्त्रीप्रत्ययको अध्ययन र प्रयोग:

टाप्, डीप्, डीष्, ।

(नोट - कारक र विभक्तिको परिचय, वाक्यरचनामा तिनको भूमिकाका विषयमा विशेष जानकारी गराउने । ६ वटै समासको परिचय, शब्द निर्माण र अर्थ सम्पादनमा समासको महत्त्व र उपयोगिताका बारेमा विशेष बोध गराउने । शब्द निर्माणमा कृत् र तद्धित प्रत्ययको महत्त्व, कृदन्तीय वाक्य रचना पद्धतिका बारेमा विशेष जानकारी गराउने । स्त्रीप्रत्ययको परिचयका साथै उक्त प्रत्ययहरूको योगले बनेका शब्दहरूको ज्ञान र प्रयोग सिकाउने । वैद्यकीय सुभाषित र हितोपदेश पढाउँदा व्याकरणको प्रयोग कसरी भएको छ सिकाउने)

एकाइ- २ : संस्कृत वाक्य विन्यास, अनुवाद र रचना**२५ घण्टा**

वाक्यरचनाको परिचय तथा कर्ता, कर्म, क्रिया, विशेष्य-विशेषण, कर्तृवाच्य, कर्मवाच्य र भाववाच्यको सामान्य जानकारी सहित संस्कृत भाषामा सामान्य वाक्य-रचना

२.१ संस्कृत वाक्यविन्यास पद्धतिको परिचय र प्रयोग

(क) सरल, संयुक्त र मिश्र वाक्यको परिचय र प्रयोग

(ख) कर्तृ, कर्म र भाव वाच्यको परिचय र प्रयोग

(ग) कृदन्तीय वाक्यविन्यास पद्धतिको परिचय र प्रयोग

(घ) पदसंगतिको परिचय र प्रयोग (वचन, पुरुष, काल, लिङ्ग, विशेष्य-विशेषण, क्रिया आदि)

(ङ) वाक्यान्तरण प्रक्रियाको परिचय र प्रयोग

(वाच्य परिवर्तन, वचन, पुरुष र काल परिवर्तन, सरल वाक्यलाई संयुक्त र मिश्रमा,

संयुक्तलाई सरल र मिश्रमा, मिश्रलाई सरल र संयुक्तमा, तिङन्तीय वाक्यलाई कृदन्तीय वाक्यमा परिवर्तन ।)

२.२ अनुवाद (नेपालीबाट संस्कृतमा र संस्कृतबाट नेपालीमा अनुवाद)

२.३ संस्कृतमा सरल निबन्ध र कथाको रचना । (निबन्ध ५ र कथा ५ ।)

२.४ हितोपदेश मित्रलाभको शुरुका ५ वटा कथा गद्यभाग मात्र

एकाइ -३ : वैद्यकीय साहित्य**२८ घण्टा**

३.१ वैद्यकीयसुभाषितसाहित्यम्कानिम्नलिखित श्लोकहरुको अर्थ र पाठ

भावार्थ एवं त्यसको व्याख्या:

अध्याय	श्लोक संख्या	अध्याय	श्लोक संख्या
१	१, २, ४	२२	१, २
२	१, २,	२३	१०, २३
३	९, १२,	२४	१, २
४	१, २,	२५	२२, २७
५	३, २०,		२५ सम्म राख्ने र गद्यभाग थप गर्ने
६	३, ४		
७	२, १३		
८	१०		
९	२, ३, १४		
१०	१, ८, १४		
११	१, १५		
१२	२, ६		
१३	१, ८, १५, १६		
१४	९		
१५	१४		
१६	९		
१७	१, १३		

१८	१२१, १६, २८		
१९	२, ६		
२०	१, ७, २२		
२१	५, ६		

३.२ अमरकोष - वनौषधिवर्ग ।

३.३ हितोपदेश - प्रस्तावना तथा मित्रलाभको शुरुका ५ वटा कथा मात्र ।

३.४ सुश्रुतसंहिता, चरकसंहिता, वाग्भटको अष्टाङ्गसंग्रह, चन्द्रनिघण्टुको सामान्य परिचय ।

पाठ्यपुस्तकहरू:

- क) नेपाली संस्कृत व्याकरण (सम्बद्धअंशमात्र), पार्थमणि आ. दी.
- ख) अनुवाद चन्द्रिका, (प्रथमप्रकाश) सोमनाथशर्मा सिग्दाल, पुस्तक संसार, काठमाण्डौं, नेपाल ।
- ग) संस्कृतशिक्षणाभ्यास (भाग १), नीलमणि ढुङ्गाना, महेन्द्र संस्कृत विश्वविद्यालय, नेपाल ।
- घ) वैद्यकीयसुभाषितसाहित्यम् (सम्बद्धअंशमात्र), डा. भाष्करगोविन्द घाणेकर, चौखम्बा विद्याभवन, वाराणसी ।
- ङ) वैद्यकीयसुभाषितसाहित्यम् (नेपाली भावानुवादसहितम्) डा. काशीराज शर्मा सुवेदी
- च) हितोपदेश (सम्बद्धअंशमात्र), विष्णु शर्मा
- च) अमरकोष (सम्बद्धअंशमात्र), अमरसिंह

सन्दर्भग्रन्थहरू :

- क) अनुवाद चन्द्रिका, (१-४ भाग) सोमनाथशर्मा सिग्दाल, (पुस्तक संसार, काठमाण्डौं) नेपाल ।
- ख) संस्कृतशिक्षणाभ्यास (१-२ भाग), नीलमणि ढुङ्गाना, नेपाल संस्कृत विश्वविद्यालय, नेपाल ।
- ग) संस्कृत व्याकरणोदय, जयमन्त मिश्र, चानैखम्बा विद्याभवन, वाराणसी, भारत ।
- घ) लघुसिद्धान्तकौमुदी, बरदराज, महेन्द्र संस्कृत विश्वविद्यालय, नेपाल ।
- ङ) रुपचन्द्रिका, रामचन्द्र भ्वा, चौखम्बा संस्कृत सिरिज, वाराणसी, भारत ।
- च) अनुवाद प्रकाशिका, बदरिनाथ भट्टराई, साभा प्रकाशन, ललितपुर, नेपाल ।

Maulik Siddant Tatha Shareera

Total: 156 hrs (4 hrs/week)
Theory: 117 hrs (3 hrs/week)
Practical: 39 hrs (1 hr/week)

Full Marks: 100 (Th. 75 + Pr. 25)

Course description

This course is designed to provide students the knowledge and skills about the basic principles of Ayurveda and description of Shareera in Ayurveda. It also includes the general knowledge of the chronological development and history of Ayurveda.

Course objectives

After the completion of the course the students will be able to:

1. Explain Dosha, Dhatu and Mala, Ojas, Agni, Shareera (body), Mana (mind), and Indriya (sense organs) with their types, properties/qualities and functions in normal as well as abnormal states.
2. Explain the physiological and pathological state of Dosha and Dushyas.
3. Describe the causative role of Dosha-Dhatu-Malas for health and illness.
4. Define Jeevaatma, Garbha, Shareera, Prakriti and Vikara.
5. Describe the Avyakta and origin of universe, formation of Shareera and its developments from Ayurvedic point of view.
6. Explain Twacha, Kalaa, Peshi, Asthi, Sandhi, Snayu, Sira, Dhamani, Ashaya, Srotas, and Marma.
7. Describe history and chronological development of Ayurveda and Charaka, Sushruta, Kaashyapa, Vagbhata etc. Samhita-granthas.

Theory

Unit- 1: Doshas:

18 hrs

- 1.1: Shareera, Chikitsya-purusha, Shareera-dosha and Manasa-dosha; the reasons for naming Dosha, Dhatu and Mala.
- 1.2: Formation of Tridosha from Panchamahabhutas, Vata, Pitta and Kapha as main constituents/components of the body and locations, different stages and movements of each of Tridosha.
- 1.3: Vata, Pitta and Kapha on etymological basis, Vata, Pitta and Kapha with Anila, Surya and Soma in nature.

Unit- 2: Vata, Pitta and Kapha Doshas:

17 hrs

- 2.1: Naisargika-gunas (physiological or natural qualities/properties) and features/symptoms of Vata, Pitta and Kapha Doshas separately, Yogavahi property of Vata.
- 2.2: Main locations and functions of Vata, Pitta and Kapha Doshas in their natural/normal state in living body.
- 2.3: Vata, Pitta and Kapha their types, locations and functions of each type in the body.
- 2.4: Features (signs and symptoms) of increased and diminished/decreased states of Vata, Pitta and Kapha in the body.

- 2.5: Causes of Prakopa (aggravation) and features (signs and symptoms) of Prakupita Vata, Pitta and Kapha in the body.
- 2.6: Sanchaya (accumulation), Prakopa (aggravation) and Prashamana (pacification) of Doshas relating to day, night, season and intake of food.

Unit- 3: Dushyas (Dhatu and Mala): **10 hrs**

- 3.1: Dushyas: Dhatu, Upadhatu and Malas.
- 3.2: Order of formation of Saptadhatu and their nutrient factors, relation of Panchamahabhutas in the formation of Dhatu, Upadhatu and Malas.
- 3.3: Different Nyaya (theories) namely Kedarikulya Nyaya, Kshiradadhi Nyaya and Khalekapota Nyaya regarding the formation of Rasadi Dhatus.
- 3.4: Causes and features (signs and symptoms) of increased and diminished/decreased states of Dhatu, Upadhatu and Malas.

Unit- 4: Agni, Ojas and Prakriti: **6 hrs**

- 4.1: Agni, Jatharagni or Pachakagni, Dhatwagni and Panchabhutagni, their functions and role of Vipaka in the formation of Rasa-dhatu.
- 4.2: Vatadi Prakriti: features (signs and symptoms) of individuals of Vatadi Prakarti.
- 4.3: Ojas: different views about Oja.

Unit-5: Panchavimshati-tatwa: **10 hrs**

- 5.1: Shareera: scope and importance of Shareera-shastra and Shavacchhedana (dissection) for practical exposure.
- 5.2: Avyakta, Purusha & Prakriti: origin and features of Saptaprakriti & Ashtaprakriti.
- 5.3: Shodasha-vikara: origin and symptoms/features of Panchakarmendriya, Panchajnanendriya and Panchamahabhuta, difference between Indriya and Indriyadhishthana.
- 5.4: Panchavimshati-tatwa, similarities & dissimilarities between Prakriti & Purusha.
- 5.5: Mana, Shaddhatupurusha and Karmapurusha, Satwa-Raja-Tama Guna of Mana.

Unit- 6: Garbha and Shareera: **16 hrs**

- 6.1: Prana, Garbhashareera and Shadanga shareera: formation of Shukra and Shonita from Panchamahabhuta, Aartava (menstrual blood), Prajananakala (reproductive period), Ritukaala.
- 6.2: Rhitumati charya, Garbhaavatarana-krama, immediate and late symptoms/features of pregnant woman and contraindications to pregnant woman after conception.
- 6.3: Monthwise foetal development and different views about the factors responsible for the development and growth of foetus and foetal life, Matrija-Pitrija-Rasaja-Atmaja Bhavas of the body, always growing and never growing organs in the body, reasons of not passing urine, stool and not weeping in foetal life.

Unit- 7: Twacha: **20 hrs**

Twacha (skin), Kalaa (membrane), Peshi (muscle), Asthi (bone), Sandhi (joints), Snaayu, Sira, Dhamani, Ashaya, Srotas, Navadwara, Marma (vital parts) of the body with their types.

Unit- 8: History of Aurveda**20 hrs**

- a. Prachina-kala (ancient period), Vaidik-kala, Samhita kala, origin and development of Ayurveda in Vaidik-kala, Charaka, Sushruta & Kashayapa samhitas. **9 hrs**
- b. Bouddha-kala and Madhyamik-kala; position of Ayurveda in Bouddha-kala and Madhyamik-kala, Briddha-vagbhata, Vagbhata, Nagarjuna and their Kritis. **5 hrs**
- c. Adhunik-kala (modern period), development of Ayurveda in Adhunik-kala and current position of Ayurveda in Nepal with brief history of Ayurveda hospital, Singhadurbar Vaidyakhana. **6 hrs**

Practical**Perform the following tasks:****Unit- 1: Illustrate the Following Asthi (bones) in Ayurvedic terms:****10 hrs**

Kapalaasthi,
Urdhwashakhasthi

Unit- 2: Illustrate the Following Anga-Avayavas in Ayurvedic terms:**18 hrs**

Paachana-pranaali Angas, Hridaya-raktasanchara Kriya, Yakrit, Pliha, Vrikka, Mashtiska, Sushumna, Stri-jananendriyas and Purusha-jananendriyas (male and female reproductive organs).

Unit- 3: Tabulate, Assess & Identify the Characteristics of Following Prakritis' of Individuals:**11 hrs**

Vaata Prakriti, Pitta Prakriti, Kapha Prakriti,
Dwandaja Prakriti and Sama Prakriti.

Text Books :

1. *Ayurvedaka Itihas Evam Parichaya: Vidyadhara Shukla and Ravi Datta Tripathi, Delhi, India.*
2. *Ayurvediya Maulik Siddhanta Tatha Sankshipta Shaareer: Ramnath Bhattarai, TU, Kathmandu.*
3. *Ayurvedako Brihat Itihas: Pro.Dr. Chandraraj Sapkota, Ayurveda Campus Kirtipur.*

Reference Books:

1. *Ayurvedako Maulik Siddhantaharu, Dr. Thakur Raj Adhikari, Kathmandu, Nepal.*
2. *Tridosha tatva vimarsha, Ram Raksha Pathak, Vaidyanath Ayurved Bhavan, Patna.*
3. *Ayurvediya kriya shaareera, Ranajeet Roy Deshain, Shree Vaidyanath Ayurved Bhawan.*
4. *Pratyaksha Shaareera (Vol.I & II), Gananath Sen, Chaukhamba Sanskrit Series.*
5. *Sushruta samhita (Shareerasthana) with Hindi commentry, Dr. Bhaskara Govinda Ghanekar, Meharachanda Lakshmanadas Publications, Dariyagunj, New Delhi, India.*
6. *Relevant portions of Kashyapa Samhita with introduction by Nepal Rajguru late Hemraj Sharma.*
7. *Sutrasthana, Sharirasthana and other relevant portions of Charaka-samhita, Asthanga-sangraha, Ashtanga-hridaya with Nepali, Hindi or English translations.*

Dravyaguna Vigyana- I

Total Hours: **234 hrs (6 hrs/week)**

Full Marks: **150 (Th. 75 + Pr. 75)**

Theory: 117 hrs (**3 hrs/week**)

Practical: 117 hrs (3 hrs/week)

Course Description

This course is designed to provide students the knowledge and skills about Dravyaguna vijnana and pharmacology. It deals with basic principles and concepts of Ayurvedic pharmacology as well as identification, properties, actions and uses of medicinal plants. It also incorporates general knowledge about essential drugs used in primary health care level.

Course Objectives

After completion of the course the students will be able to:

1. Explain the origin and scope of Dravyaguna vijnana.
2. Explain Dravya & drug, its medicinal value and Panchabhautic attributes.
3. Difference between Bhautika & Karmuka meanings of Guna, Gurvadi twenty Guna & their effects on Doshas.
4. Describe mutual relation of Rasa, Guna, Veerya, Vipaka and Prabhava residing in Dravya.
5. Explain Karma, its types, and factors responsible for the action of a drug.
6. Define Bheshaja and Bheshaja-prayoga and describe absorption, distribution, metabolism and excretion of drugs.
7. Define combination, suitability, incompatibility, synergism, antagonism, reaction, side effects, routes, method, time and duration of drug administration.
8. Explain the factors to be considered for determination of dose, Anupana-Sahapana, Pathya-Apathya, contra-indications, precautions for drug administration.
9. Describe the basis of nomenclature and parts used in medicine.
10. Describe the preservation & storage process of medicinal plants.
11. Define the concept of biodiversity conservation.
12. Enlist the essential drugs for health post & primary health care level.
13. Explain indications, contra-indications, dose, uses and side effects and of the essential drugs, Immunization schedule
14. Enlist and explain essential Ayurveda drugs for Ayurveda dispensaries and service centres.

Theory

Unit 1: Dravyaguna-vijnana and Pharmacology:

6 hrs

- 1.1. Introduction
- 1.2. Dravyaguna vijnana and its Saptapadartha (seven components),
- 1.3. Dravya, Guna, Karma, Samanya, Vishesha and Samavaya.
- 1.4. Origin and historical background
- 1.5. Scope and importance

Unit 2: Dravya (Drugs)

10 hrs

- 2.1 Dravya, medicinal value and panchabhautic attributes
- 2.2 Classification of the dravyas on the following basis/aspects

Karya-karana, Chetana, Origin and source, Life or age, Size and shape,
Place Panchabhautic composition, Rasa, Veerya, Vipaka,

2.3 Introduction and indication and dose of the following gana/varga

Triphala	Trikatu	Trimada	Trijataka
Chaturjata	Chaturushana	Chaturbeeja	Chatusneha
Panchakola	Panchatikta	Panchatrinamoola	Panchavalkala
Panchapallava	Laghupanchamoola	Brihatpanchamoola	Kantakapanchamoola
Shadushana	Ashtavarga	Dashamoola	Jeevaniyagana
Vishaupavishalavana- panchakapanchagavya			
panchamritkshirastak		mutravargapittapanchakamadhuvarga	

Unit 3: Guna (properties of drugs):

17hrs

- 3.1. Guna, types & importance of guna, general & specific meaning of guna, difference between bhautika (physical) & karmuka (pharmacological) meanings of guna
- 3.2. Gurvadi twenty guna and their effects on doshas
- 3.3. Rasa: 6 types of rasa and panchabhautic composition, guna-karma (properties and actions), dosha-karma (effects of 6 rasas on tridosha), relation between sixrasas and 6 seasons (rhitu)
- 3.4. Veerya, types and effects of it on tridosha.
- 3.5. Vipaka, types of vipaka and effects of it on tridosha.
- 3.6. Prabhava with examples, mutual relation of rasa, guna, veerya, vipaka and Prabhava residing in Dravya.

Unit 4: Karma (actions and effects of drugs):

15hrs

- 4.1: Karma: Definition and types of karma.
- 4.2: Mechanism of drug action and factors responsible for the action of a drug, classification of the actions of drugs.
- 4.3: Definition of the following terms with examples

Deepana	Pachana	Shamana	Stambhana
Grahi	Anulomana	Sramsana	Bhedana
Chedana	Lekhana	Ropana	Prasadana
Medhya	Hridya	Varnya	Kanthya
Santarpana	Apatarpana	Brimhana	Langhan
Rasayana	Vajikarana	Sandhaniya	Snehana
Swedana	Mutrala	Mutrasangrahaniya	Vedanasthapana
Shulaprashamana		Kasahara	Shwasahara
Shothahara	Kandughna	Krimighna	
Vishaghna	Rakshoghna	Jivaniya	Stanyajanana
Vyavayi	Vikashi	Madakari	Yogavahi
Vamana	Rechana	Shirovirechana	Shodhana
Pittasaraka	Balya	Keshya	Raktastambhana
Ojovardhaka	Ashmaribhedana	Chakshusya	

Unit 5: Bheshaja-prayoga (use of drugs): **20hrs**

- 5.1: Bheshaja (ideal drug) and bheshaja-prayoga, aims and objectives of using medicines, and prescription.
- 5.2: Combination, suitability, incompatibility, synergism, antagonism, reaction and side effects
- 5.3: Bheshaja-kala (time and duration of drug administration)
- 5.4: Bheshaja-marga(routes) and Bheshaja prayoga-vidhi (methods of drug administration), describe the basis of selection of the routes of drug administration.
- 5.5: Dosage and posology, common and specific dose, factors to be considered for determination of dose(bheshajamatra)
- 5.6: Anupana, Sahapana, Pathya and Apathya, contra-indications and precautions for drug administration.

Unit 6: Identification, Conservation, Collection, processing & Storage of Dravya: **15hrs**

- 6.1: Introduction, The basis of nomenclature, Impurities and methods of purification and parts used in medicine, ideal drug.
- 6.2: Types of land, ideal land, availability of medicinal plant in various geographical regions of Nepal.
- 6.3: Source, methods and time/season of collection, drying, preservation and storage of medicinal plants, herbarium collection and preparation.
- 6.4: Basis of selection of medicinal plants for cultivation and propagation, method of cultivation and various aspects to be considered for cultivation of medicinal plants.
- 6.5: Concept of biodiversity conservation, the method of conservation, data collection and research on medicinal plants.
- 6.6 Introduction to rare and endangered species of medicinal plant of Nepal in CITES

Prioritized herbs for economic development of Nepal by the Government of Nepal

Unit 7: Essential Drugs: **34hrs**

- 7.1: Definition and importance
- 7.2: List of essential drugs (single and compound formulations) for Ayurveda dispensaries and service centre:
 1. Ajirnahara
 2. Atisaraghna
 3. Apasmarahara
 4. Agnidaghashamaka
 5. Amlapittaghna
 6. Arshadi Gudavikarahara
 7. Netrarogahara
 8. Aghatahara
 9. Amavatahara
 10. Unmadahara
 11. Karnarogahara
 12. Kamalahara
 13. Kasahara
 14. Krimighna
 15. Gandamalahara
 16. Gridhrasihara
 17. Charmarogaghna
 18. Jwarahara
 19. Pandurogaghna
 20. Pinasa/Pratishyayahara
 21. Pravahikahara
 22. Pakshaghatahara
 23. Balya/ Duarbalyahara
 24. Pramehahara
 25. Mukharogahara
 26. Dantarogahara
 27. Mutrarogahara
 28. Yakritpliharogahara
 29. Rajovikarahara
 30. Raktabharajanyavikarahara
 31. Raktapradaranashaka
 32. Raktapittahara
 33. Vataraktahara
 34. Vibandhahara
 35. Vishamajwarahara
 36. Sheetapittahara

37. Shirorogahara	38. Shoolahara	39. Shothahara
40. Shwasahara	41. Shwitranashaka	42. Shlipadanashaka
43. Shwetapradarahara	44. Sutikarogaghna	45. Hridayarogahara
46. Vishanashaka	47. Balarogahara	48. Chhardirotogahara
49. Hikkashamaka	50. Masurikahara	51. Sthaulyanashaka
52. Vedanahara	53. Vranahara	54. Vipadikahara

Practical

117 hrs (3 hrs/week)

Perform the following tasks:

1. Prepare herbarium specimens:
 - Field visits and specimen collection
 - Pressing and drying
 - Mounting
 - Preservation
 - Labelling
 - Storage
2. Collect specimens of medicinal plants.
3. Perform field visit, National herbarium centre, herbal garden, farm and report writing.
4. Conduct organic farming of medicinal plants.

Reference Books:

- द्रव्यगुण विज्ञान भाग १-५: आचार्य प्रियव्रत शर्मा, चौखम्भा भारती अकादमी, वाराणसी, भारत ।
- द्रव्यगुण विज्ञानम् (पूर्वार्द्ध र उत्तरार्द्ध) : श्री यादवजी त्रिकमजी आचार्य, वैद्यनाथ आयुर्वेद भवन, भारत ।
- द्रव्यगुण विज्ञान : डा. प्रदीप के.सी. र डा. जया सत्याल, मकालु बुक्स एण्ड स्टेसनर्स, काठमाण्डौ, नेपाल ।
- भावप्रकाश निघण्टु (आचार्य भावमिश्रकृत) : टीकाकार डा. कृष्णचन्द्र चुनेकर तथा डा. गंगासहाय पाण्डेय, चौखम्भा भारती अकादमी, वाराणसी, भारत ।
- चरकसंहिता, सुश्रुतसंहिता, अष्टाङ्गसंग्रह र अष्टाङ्गहृदयको उपयोगी अंश ।
- निघण्टु आदर्श (पूर्वार्द्ध र उत्तरार्द्ध) : श्री बापालाल ग. वैद्य, चौखम्भा भारती अकादमी, वाराणसी, भारत ।
- स्थानीय जडीबुटीद्वारा स्वास्थ्य-रक्षा : डा. श्याममणि अधिकारी, नेपाल संस्कृत विश्वविद्यालय, नेपाल ।
- आयुर्वेद विज्ञान डा.काशीराज शर्मा सुवेदी, आयुर्वेद क्याम्पस कीर्तिपुर, नेपाल ।

Rasashatra Tatha Bhaisajya Kalpana-I

Total hrs: 234 hrs (6 hrs/week)

Full marks: 150 (Th. 50+Pr. 100)

Theory: 78 hrs (2 hrs/week)

Practical : 156 hrs (4 hrs/week)

Course Description

This course is designed to help students to acquaint with the knowledge and skills on different aspects of Rasa Shastra & Bhaisajya Kalpana in Ayurveda. Students taking up diploma course in Ayurvedic Pharmacy must have basic knowledge of Rasa Shastra and Bhaishjya Kalpana an ancient science of alchemy. They must know the classical methods and principles involved in the manufacturing of different Ayurvedic formulations and should also get the practical training of preparing these drugs. They must also know the basic concepts of identification, Collection, manufacturing, storage, preservation and dispensing of Ayurvedic drugs. The syllabus of diploma course includes these aspects of teaching and training.

Course objectives

After completion of this course the students will be enabled to:

1. Describe the methods and principals of manufacturing different Ayurvedic formulations.
2. Conduct practical training of preparing the drugs.
3. Explain identification & collection, manufacturing, storage, preservation and dispensing of Ayurvedic drugs.

Part – I : Rasashastra

Unit 1: Introduction to Rasa Shastra

5 hrs

- 1.1. Introduction, Definition & importance of Rasa Shastra.
- 1.2. Brief history of Rasa Shastra in Vedic Era, in Ayurvedic literature and in Modern science.

Unit 2: Pribhasha (Definition)

5 hrs

- 2.1. Shodhana,
- 2.2. Sanskar,
- 2.3 Marana,
- 2.4 Satvapatan,
- 2.5 Nirvap,
- 2.6 Avap,
- 2.7 Dhanvantaribhag,
- 2.8 Rudrabhag,
- 2.9 kajjali,
- 2.10 Patanpishti,
- 2.11 Dhanyabhrak,
- 2.12 Hinguloth Parad.

Unit 3: Yantra, Putas and Musha

10 hrs

3.1 Yantra:

- Introduction to Yantra,
- Various types of yantras – Dolayantra, Vidyadhar yantra, Taptakhalva yantra etc.

3.2 Putas

- Brief description of putas and
- Uses of putas like Gajaputa, Mahaputa, Laghuputa, Varahaputa, Kukkutaputa, Muffle furnace etc.

3.3 Musha

- Brief description of musha
- Types of musha like Samanya Musha, pakwa musha, vajra musha etc and chullikas (Angarakoshthi).
- Modern devices of heating like Electric stove, Heating Mantle, Gas stove etc their Types & Uses.

Unit 4: Parada

10 hrs

- 4.1 Parada –synonyms, origin, its impurities, gatis,
- 4.2 Samanya – Vishesh Shodhana, Shudha parada lakshana
- 4.3 Parad Murchhita Aushadha vargikarana – Kharliya, Parpati, Kupi pakwa& Pottali, rasayana

Unit 5: Maharasas –

8 hrs

- Introduction/Synonyms, Identification, Types, shodhana, Marana, Therapeutic doses and Compound formulations.

Part – II : Bhaisajya Kalpana

Unit 1: BhaishajyaKalpana

3hrs

- History,
- Chronological development
- Fundamental principles

Unit 2: Yantras (Instruments)

2 hrs

- Ancient and Modern Equipments : KhalwaYantra, Arkayantra, PatanaYantra,
- ModernYantras: Disintegrator, Pulverize, Mixer, Grinder, Edge runner, End runner , Ballmill Machine, Seive Shaker, Granulator, Tableting machine, Pill Making machines, Coating and polishing Pans, Capsule filling Machine, Dryer, , Hot Air Oven, Dehumidifier etc.

Unit 3: Mana paribhasha (units of measurements)

3 hrs

- Ancient and Contemporary Systems of Mana- Pautava, Dravaya and Payyamana

Unit 4: Saviryatavadhi (Shelf life)

6 hrs

- Concept of Saviryatavadhi (Shelf life),
- Stabilization of Pharmaceutical products,
- Antioxidants,
- Preservatives and Sterilization.

Unit 5: Pharmacopoeia**6 hrs**

- Introduction to Pharmacopoeias
- Ayurvedic Pharmacopoeia of India (API) and Ayurvedic Formulary of India (AFI).
- Herbal Pharmacopoeias of US
- Herbal guidelines of WHO
- British Pharmacopoeia

Unit 6: Standardization of Ayurvedic Drugs**7 hrs**

- Standardization and its importance in present scenario,
- Standardization parameters to all Kalpanas.
- Concept of Good Manufacturing Practices(GMP)
 - WHO: GMP,
 - CGMP,
 - Ayurveda GMP of India,
 - Ayurveda GMP of Nepal

Unit 7: Introduction to Panchavidha kashaya Kalpana**7 hrs**

- 7.1. Swaras (Expressed juice) – Tulasi Swarasa, Ardraka Swaras
 - Introduction
 - Method of Preparation as per classics,
 - Ingredients,
 - General dose & indications.
- 7.2. Kalka (Paste) – Nimba Kalka, Rasana Kalka,
 - Introduction
 - Method of Preparation as per classics,
 - Ingredients,
 - General dose & indications.
- 7.3. Kwatha (Decoction)- Triphala Kwatha, Punarnavashtaka Kwatha
 - Introduction
 - Method of Preparation as per classics,
 - Ingredients,
 - General dose & indications.
- 7.4. Hima (Cold infusion)- Dhanyakadi Hima, Sarivadi Hima
 - Introduction
 - Method of Preparation as per classics,
 - Ingredients,
 - General dose & indications.
- 7.5. Phanta (Hot infusion)- Panchakola Phanta , Yasthimadhu Phanta
 - Introduction
 - Method of Preparation as per classics,
 - Ingredients,
 - General dose & indications.

Unit 8: Upakalpanas:**6 hrs**

Introduction, Method of Preparation as per classics, Ingredients, and general dose of the following upakalpanas:

- Pramathya- (Mustadi Pramathya),
- Aushadha siddha paneeya- (Shadanga Paneeya)

- Tardulodaka,
- Laksha rasa,
- Mantha – (KharjuradiMantha),
- Panaka-(ChinchaPanaka),
- Arka (Distillation) – PudinaArka,
- Rasakriya- (Babul Rasakriya),
- Phanita, Avaleha- Chyavanaprashavalehya,
- Ksheerapaka-(Arjunaksheerapaka),
- Satwa (GuduchiSathwa),
- GugguluKalpana- (TriphalaGuggulu).
- MasiKalpana–(TriphalaMasi).
- LavanaKalpana–(NarikelaLavana)

Practical:

117 hrs

Perform the following tasks of Rasashastra and Bhaishajya Kalpana:

Part I : Rasashastra

62 hrs

1. Parada Shodhana – (2 x 7 Hrs)
2. Hingulotha Parada Nirmana – (3 Hrs).
3. Preparation of Kajjali – (3 x 7 Hrs)
4. Preparation of Rasa Parpati – (3 Hrs.)
5. Preparation of Shweta Parpati – (3 Hrs).
6. Abhraka Shodhana – (2 Hrs.)
7. Preparation of Dhanyabhraka – (3 Hrs x 2)
8. Makshika Shodhana – (2 Hrs.)
9. Vimala Shodhana – (2 Hrs.)
10. Shilajatu Shodhana – (3 Hrs.)
11. Sasyaka Shodhana – (3 Hrs.)

Part II: Bhaishajya Kalpana:

55 hrs

1. Ardraka Swarasa – 4 Hrs.
2. Tulasi Swarasa – 3 Hrs.
3. VasaPutra Paka Swarasa – 4 Hrs.
4. Nimba Kalka – 3 Hrs.
5. Rasona Kalka – 3 Hrs.
6. Punarnavashtaka Kwatha – 4 Hrs.
7. Rasna Saptaka Kwatha – 4 Hrs.
8. Dhanyaka Hima – 3 Hrs.
9. Panchakola Phanta – 4 Hrs.
10. Mustadi Pramathya – 3 Hrs.
11. Kharjuradi Mantha – 4 Hrs.
12. Shadangapaniya – 3 Hrs.
13. Laksha Rasa – 4 Hrs.
14. Gulab Arka – 3 Hrs.
15. ChinchaPanaka – 3 Hrs.
16. NimbuSarkara – 3 Hrs.

Reference books:

1. Chaturbhuja Mishra, *Rasa Hrdaya Tantram*, Mugdhavbodhini Commentary, Chaukhamba publishers, Varanasi.
2. Indradev Tripathi, *Rasarnava*, Rasachandrika Hindi commentary, Choukhamba Sanskrita Series, Varanasi.
3. Siddhinandan Mishra, *Rasendra Chudamani*, Siddhiprada Hindi commentary, Choukhamba Orientalia, Varanasi.
4. Siddhinandan Mishra, *Anandakanda*, Siddhiprada commentary, Choukhamba Orientalia, Varanasi.
5. D. A. Kulkarni, *Rasaratna Samuchchaya*, Vijnanabodhini Hindi commentary, Meharchanda Lachhmandas Publications, New Delhi.
6. Indradev Tripathi, *Rasendra Sara Sangraha*, Rasavidyotini Hindi Commentary, Chaukhamba Orientalia, Varanasi.
7. Gularajsharma Mishra, *Ayurveda Prakasha*, Artha Prakashini Hindi commentary, Choukhamba Bharati Academi, Varanasi.
8. Lakshmpatishastri, *Yogaratanakara*, Vidyotini Hindi commentary, Choukhamba Sanskrit Sansthan, Varanasi.
9. Hariprapanna Sharma, *Rasa Yoga Sagara*, Chaukhamba Krishnadas Academy, Varanasi.
10. Sharma Sadanand, *Rasatarangini*, Rasavigyana Hindi commentary, Motilal Banarasidas Publication, Delhi.
11. Sri Siddinandana Mishra, *Ayurvediya Rasashastra*, Chaukhamba Orientalia, Varanasi.
12. Acharya Sharangadhara, edited by Shrikanthamurthy KR. *Sharangadhara Samhita*, Varanasi: Chaukhamba Orientalia.
13. Sharangadhara, *Sharangadhara Samhita*, Pandit parshuram shastri vidyasagar, Chaukhamba Orientalia.
14. Govind Das, Bhaishajya Ratnavali, Hindi commentary by Ambikadatta Shastri, Varanasi: Chaukhamba Prakashan.
15. G S Iyengar et al, *Database on Medicinal Plants used in Ayurveda and Siddha*, Central Council for Research in Ayurveda and Siddha, Department of Ayush, Ministry of Health and Family Welfare, Government of India, New Dehli.

Pharmaceutical Chemistry

Total: 156 hrs (4 hrs/week)

Full marks: 100 (Th. 50 + Pr. 50)

Theory: 78 hrs (2 hrs/week)

Practical : 78 hrs (2 hrs/week)

Course description

This course is designed to acquaint students with the knowledge and skills on physico-chemical properties of organic and inorganic pharmaceutical ingredients and their biological action in relation to their chemical structure and recommended method/s of their quality control.

Course objective

After completion of this course student will be able to:

1. Describe the organic pharmaceutical ingredients, their official monographs and articles.
2. Explain nomenclature of organic compounds with special reference to heterocyclic system.
3. Explain structure, storage, handling and quality assurance of the organic drug molecules.
4. Interpret the inorganic pharmaceutical ingredients, official monographs and articles.
5. Describe the physico-chemical properties, method(s) of quality control, storage, stability, incompatibilities and medicinal and pharmaceutical use of various ingredients.

Theory

Unit 1: Introduction

2 hrs

- 1.1 Importance of organic and inorganic drug molecules as a whole and focus to pharmacy.
- 1.2 Pharmacopoeia, official monograph and their importance.
- 1.3 Interpret one pharmacopoeial monograph as an example.
- 1.4 Brief history of the development of pharmaceutical chemistry.

Unit 2: Acids, Bases, Buffers, Antioxidants and Preservatives

5 hrs

Physico-chemical properties, method(s) of quality control, storage, stability, incompatibilities and medicinal & pharmaceutical use of:

- 2.1. Boric acid, Hydrochloric acid
- 2.2. Strong ammonia solution, Calcium, Sodium & Potassium hydroxide
- 2.3. Citric acid, Sodium citrate, Sodium phosphate, Sodium Benzoate

Unit 3: Gastrointestinal agents

6 hrs

Physico-chemical properties, method(s) of quality control, storage, stability, incompatibilities and medicinal & pharmaceutical use of:

- 3.1. Acidifying agent: Hydrochloric acid.
- 3.2. Antacids: Sodium bicarbonate, Aluminum hydroxide gel, Magnesium carbonate, Magnesium Aluminum Silicate, Magaldrate, Magnesium Trisilicate, combination of antacids.
- 3.3. Protective, adsorbents, and Laxative: Charcol, Bismuth, Kaolin, Magnesium Sulphate and zinc Sulphate.

Unit 4. Topical agents**6 hrs**

Physico-chemical properties, method(s) of quality control, storage, stability, incompatibilities and medicinal & pharmaceutical use of:

- 4.1. Protective: Talc, Zinc Oxide, calamine.
- 4.2. Anti-microbial and astringents: H₂O₂, KMNO₄, Iodine, boric acid, silver nitrate, mercury compounds sulphur compound, Selenium sulphide.
- 4.3. Astringents: Alum, Zinc sulphate.

Unit 5: Inhalants and stimulants, expectorants, emetics and antidote**5 hrs**

Physico-chemical properties, method(s) of quality control, incompatibilities and medicinal & pharmaceutical use of:

- 5.1. Oxygen, Carbon dioxide and Nitrous oxide,
- 5.2. Ammonium carbonate, ammonium chloride, potassium iodide and sodium nitrate.

Unit 6: Major intra and extra cellular electrolytes**10 hrs**

Physico-chemical properties, method(s) of quality control, storage, stability, incompatibilities and medicinal & pharmaceutical use of:

- 6.1. Acid-base balance and replacement Therapy,
- 6.2. NaCl, KCl, NaHCO₃, Ringer lactate and other electrolyte for the correction of salt and electrolyte balance special focus to diarrhea, dietary deficiency and Cholera.

Unit 7: Quality Control of Inorganic active pharmaceutical ingredients.**14 hrs**

- 7.1. Quality control and Quality assurance
- 7.2. Sources of impurities in pharmaceutical ingredients.
- 7.3. Identification tests for cations and anions and limit tests for chloride, sulphate, iron and heavy metals as per pharmacopeias
- 7.4. Melting, point, boiling point, specific gravity and other physico-chemical parameters of inorganic ingredients.
- 7.5. Chromatography: Introduction, stationary phase and mobile phase Chromatographic techniques with special focus to Column Chromatography and introduce HPLC.
- 7.6. Volumetric Analysis
 - Volumetric Analysis Formulae
 - Eqv. Mass of Oxidant and Reductant
 - Concentration of Solution
 - Normality Factor (f)
 - Standard Solution
 - Titration
 - Selection of pH indicator (choice of pH indicator)
 - Determination of concentration of solution (Normality equation)
 1. Different ways of expressing the concentration of solutions: Molarity, Normality, Molality, Gram /Litre, Percentage
 2. Titration: acid-base titration, Redox titration
 - Primary standard substances, primary standard solution, secondary standard solution, end point, equivalence point, neutral point, indicators
Introduce normality equation
 - Relation between normality, molarity and percentage

- Selection of indicators in acid-base titration and pH curve

Unit 8: Nomenclature of organic compounds **5 hrs**

- 8.1. Nomenclature of Organic Compounds, IUPAC rule special reference to heterocyclic system.
- 8.2. Definition, characteristics of aromatic compounds, Huckel's rule, structure of benzene, isomerism and orientation of benzene derivatives
- 8.3. Benzene ring and its numbering system
- 8.4. Physical and Chemical properties of benzene

Unit 9: Structure, storage, handling and quality assurance of organic drugs **25 hrs**

- 9.1. Antiseptic and disinfectants: 5 hrs
 - Formaldehyde.
 - Acriflavine, Proflavine, Benzylkonium chloride, Cetrimide, phenol and cresol.
 - Sulfonamide and Anti-leprotics.
 - Suphanilamide, Co-trimoxazole.
 - Silver Sulfadiazine, Sulphadimethoxin, Sulphaguanidine, Thalazole, Dapsone, Clofazemin.
- 9.2. Antimicrobial Agents: 5 hrs
 - Amoxicillin, Ampicillin, Cephalexin, Cefixime, cefadroxil, Doxycycline, Erythromycin, Gentamicin, Azithromycin, Nalidixic acid, Norfloxacin, Ciprofloxacin, Ofloxacin
- 9.3. Anti-amoebic and Anthelmintics: (12 hrs) 5 hrs
 - Metronidazole, albendazole and chloroquin.
 - Tinidazole, Secnidazole, Diloxanidefuorate, Mebendazole, Paryntelpamoate, DEC. Anti-malarials: Quinine group (Chloroquine and others) TMP and pyremethamine, Artemisenine derivatives.
- 9.4. Scabicides and pediculocides 2 hour
 - GBHC, Benzyl benzoate.
- 9.5. Analgesic, Anti-pyretic and NSAID: 3 hrs
 - Codeine, Paracetamol and Ibuprofen.
 - Pethidine, Tramadol, Petazocin, Diclofenac, Mefenamic acid, Nimesulide and Glucosamine.
- 9.6. Vitamins, Minerals and Enzymes: 5 hrs
 - Vitamin A, Vitamin B group, Vit. C, Vitamin D, Niacinamide, D-panthenol,
 - Iron salts and iron soluble polymers, Folic acid.
 - Vitamin E, Vitamin K, Calcium, Zn, Cu, Mn, Diastase, Pepsine, Pancreatin, Serratiopeptidase, Chemotrypsine.

Practical - 78 hrs

Unit 1: Arrangement of the basic preparation for the quality control experiments of inorganic pharmaceutical ingredient **8 hrs**

- 1.1 Perform the Monograph/protocol interpretation of given experiment.
- 1.2 Prepare necessary glassware.
- 1.3 Handle instrument/apparatus for the given experiment/s and perform their operation.

Unit 2: Experiments on pharmacopoeial identification tests of cations and anions **10 hrs**

- 2.1 Carry out identification tests of the following Cations: Al, Ba, Bi, Ca, Mg, Mn, Cu, Zn, Fe, Ni, Ag, Na, K, Mg.
- 2.2 Carry out identification tests of the following Anions: halides, Thiocyanate, phosphate, Sulphate, borate, Bromate and bromide, carbonate, nitrate.

Unit 3: Experiments on qualitative inorganic analysis of ions and radicals from unknown compounds **10 hrs**

- 3.1 Perform the analysis of mixture containing cations.
- 3.2 Perform analysis of mixture containing anions.

Unit 4: Experiments on limit tests **12 hrs**

- 4.1 Carry out the test for heavy metals - Iron, Arsenic, Sulphur, and Mercury (ayurvedic medicine (at least 10 ayurvedic medicines).
- 4.2 Carry out the test for Chloride, Sulphate.

Unit 5: Experiments on reagent preparations, pH determination and volumetric analysis representing all methods of titrations **18 hrs**

- 5.1. Prepare necessary reagents- acid, alkali, salt solution and their standardization (percentage w/w, percentage w/v, Molarity, Molality, and Normality)
- 5.2. Perform the experiment on the change in pH on the addition of strong acid and strong base in acidic, basic, neutral and buffered solution.
- 5.3. Perform the titration of strong acid and strong base, weak acid and weak base, weak acid and strong base, strong acid and weak base.
- 5.4. Perform the titration of polyprotic acid and strong base.

Unit 6: Experiments for Systemic qualitative test of Organic pharmaceutical Ingredients **12 hrs**

- 6.1. Determine solubility and melting point of Paracetamol, Metronidazole, Amoxicillin, Tetracycline and Citric acid.
- 6.2. Determine Boiling point of alcohol and Glycerin.
- 6.3. Carry out Identification test of at least five common active pharmaceutical ingredients and excipients (Metronidazole, Paracetamol, Iodine, Starch, lactose).

Unit 7: Identification of unknown organic and inorganic compounds. **8 hrs**

- 7.1. Identify at least two unknown organic compounds.

References

(Latest edition to be referred of all the Books):

1. Mahadik KR and Kucher BS- Concise inorganic Pharmaceutical chemistry, Nirali Prakashan, 2004.
2. Kasture AV and Wadker- Pharmaceutical chemistry I & II NiraliPrakashan.
3. Bekeet AH and Stenlk- Practical Pharmaceutical Chemistry 4th edition Part I & II.
4. Kasture AV and Wadker- Practical Pharmaceutical chemistry I & II, NiraliPrakashan.
5. Antheron LM-Bently's& Drivers text book of Pharmaceutical chemistry, Oxford University Press London.
6. Kadam et.al – Principles of Medicinal Chemistry Vol. I & II.
7. Kasture AV et.al – Pharmaceutical analysis Vol I & II, NiraliPrakashan
8. Daniel C Harris- Quantitive Chemical Analysis, W H Freeman and Company.
9. Jeffrey GH et.al-Vogel's Textbook of Quantitative Chemical Analysis 5th Edition.
10. Tipins HP Dhake AS- Inorganic Pharmaceutical chemistry, Career publication, 2002.
11. Belsare P and Dhake AS- Inorganic Chemistry (Practical), Career publication.
12. Indian Pharmacopoeia latest edition.
13. British Pharmacopoeia latest edition.

Biochemistry and Microbiology

Total: 156 hrs (4 hrs/week)

Theory: 117 hrs (3 hrs/week)

Full marks: 100 (Th. 75 + Pr. 25)

Practical: 39 hrs (1 hrs/week)

Course Description

This course is designed to equip students with the knowledge and skills of Biochemistry and Microbiology. The course is also focused on the basic metabolism and qualitative and quantitative tests biomolecules. The course equips the students with the basic knowledge of microbiology and its role in ayurvedic herbs and ayurvedic medicines.

Course Objectives

After completing the course the student will be able to:

1. Develop general concept of metabolism and tests of Carbohydrate, amino-acids and fats.
2. Explain the role of minerals and water for biochemical process.
3. Describe the immunity and role of T-cell, B-cell and antibody.
4. Familiarize the basic concepts of nucleic acid and recombinant DNA technology.
5. Develop the concepts of microbial activities in ayurvedic medicines and medicinal herbs.
6. Identify the properties of Microorganisms basic (Bacteria, Fungus and Virus).
7. Describe the culture media and aseptic techniques.

Theory

Part I: Biochemistry **57 hrs**

Unit 1: Introduction of biochemistry **6 hrs.**

- 1.1 Introduction to biochemistry and its importance for health science students.
- 1.2 Explain structure, composition, classification and multiplication of human cell.

Unit 2: Definition, Classification, Importance and Basic metabolism of the followings: **40 hrs**

- 2.1 Carbohydrates
 - Glycolysis, Glycogenolysis, Glycogenesis, Gluconeogenesis, Citric acid cycle
- 2.2 Amino acids, Peptides and Proteins
 - Transamination, translation, transcription, Deamination, Urea cycle
- 2.3 Lipids and fatty acids
 - Fat metabolism, Beta-oxidation of palmitic acid
- 2.4 Interpret the relation of Carbohydrate, Fat and protein metabolism.
- 2.5 Vitamins: Definition, Classification and Clinical significances
- 2.6 Enzymes: Definition, Classification, Coenzymes, Isoenzymes, Clinical enzymology
- 2.7 Role of Minerals, ions and water in life processes

Unit 3: Fundamental of Immunology **7 hrs**

- 3.1 Immune system and type of Immunity.
- 3.2 Sources and properties of antigens, vaccines and sera
- 3.3 Anti-bodies, T and B-lymphocytes, T-cell

Unit 4: Basic concepts of nucleic acid and recombinant DNA technology **4 hrs**
4.1 DNA and RNA.
4.2 DNA replication.
4.3 Nucleic acid hybridization

Part II: Microbiology **60 hrs**

Unit 1: Introduction to Pharmaceutical Microbiology. **6 hrs**
1.1 Microbiology.
1.2 Historical development of microbiology
1.2 Application of microbiology with special reference to pharmaceutical sciences.

Unit 2: Microorganisms **30 hrs**
2.1 BACTERIA: General morphology, Classification of Bacteria. Growth curve, growth factors, Nutrition, Requirements and factors affecting growth. Culture Media, Bacterial cultures and staining methods, Bacterial resistance to antibacterial therapy
2.2 VIRUSES: General introduction and Classification
2.3 FUNGI/YEAST/MOLDS: Types, morphology, pharmaceutical importance of fungi and yeasts

Unit 3: NORMAL FLORA: Normal flora of skin, Intestinal tract, ear, nose. **4 hrs**

Unit 4: Control of Microbes: **5 hrs**

- Different method of sterilization and disinfections-
- Aseptic techniques
- Sterility Testing,
- Sterilization of pharmaceutical ingredients and dosage forms.
- Environmental monitoring

Unit 5: Microbial assay of antibiotics and vitamins-method **5 hrs**

Unit 6: Identification of Microbial and other contamination of medicinal herbs and ayurvedic medicines. **10 hrs**

Practical

Unit 1: Identification and estimation of the following: **19 hrs**
1.1 Perform the test of Carbohydrate: Molisch Test/ Benedict's test and iodine test for starch.
1.2 Perform the test for Proteins: Biuret test
 In urine: Heat + Acetic acid, Sulphasalicylic acid, Strip method.
1.3 Perform the test for Amino acids: Ninhydrin Test
1.4 Perform the test of Lipid: Cholesterol (Lieberman Burchard test).
1.5 Perform the test of dextrose as blood sugar (Enzymatic test).
1.6 Perform the test for:

- Urea (DAM method) and Creatinine (Jafrie reaction method).
- Bilirubin (Vandenberg reaction)
- Calcium (OCP Method).

- 1.7 Perform qualitative tests of abnormal urinary constituents (Glucose, ketone bodies, hemoglobin)

Unit 2: Microbiology practical

20 hrs

- 2.1 Perform staining and microscopic examination of Sputum by ZN stain
- 2.2 Identify microorganism by gram stain
- 2.3 Demonstrate various bacterial colonies
- 2.4 Carry out dry heat sterilization and moist heat sterilization
- 2.5 Demonstrate the antibiotic sensitivity test
- 2.6 Identification of Microbial and other contamination of medicinal herbs and ayurvedic medicines in market (at least 10 each).

References:

1. *Biochemistry – U. satanarayna , U. chakrapani*
2. *Biochemistry – Donald Voet , Judith G Voet*
3. *Furest R - Microbiology in Health and Disease, W.B Saunder & Co,*
4. *Bialley and Scott - Digonostic Microbiology.*

Pharmacognosy

Total: 195 hrs (5 hrs/week)

Full marks: 125 (Th.75+Pr.50)

Theory: 117 hrs (3 hr/week)

Practical: 78 hrs (2 hr/week)

Course Description

This course is designed to familiarize students with the concept of Pharmacognosy, this shows study of the natural products utilized as drugs, and their medicinal and Pharmaceutical importance. It studies cultivation and collection of drugs of natural origin and adulterants in them.

Course Objectives

After completing the course the student will be able to:

1. Identify the parameters for cultivation and collection of medicinal plants.
2. Identify adulterants
3. Explain detailed pharmacognostic parameters and phytoconstituents of different categories of medicinal plants.

Course Contents

Theory

Unit 1: Pharmacognosy

(10 hrs)

1.1 Introduction:

- Definition,
- History,
- Scope & development

1.2 Source & Classification of Drug: Various systems of classification of drugs and natural origin:

- Alphabetical,
- morphological,
- taxonomical,
- chemical &
- Pharmacological.

1.3 Quality Control of Crude Drugs: Adulteration of crude drugs and their detection methods:

- Organoleptic,
- Microscopic,
- physical,
- Chemical and biological.
- WHO and API guidelines for standardization of medicinal plants.

Unit 2: Cultivation, Collection, Processing & Storage of Crude Drugs:

(10 hrs)

2.1 Factors influencing cultivation, collection, drying and storage of medicinal plants.

2.2 Type of soils & fertilizers of common use.

2.3 Pest & pest management, natural pest control agents (Tobacco, Pyrethrum, Cevadilla, Neem, Ryania)

- 2.4 Plant hormones and their applications.
- 2.5 Polyploidy, mutation & hybridization with reference to medicinal plants

Unit 3: Adulteration and drug evaluation Significance of pharmacopoeial standards. (5 hrs)

Unit 4: Brief outline of occurrence, distribution, outline of isolation, Identification tests,

Therapeutic effects and pharmaceutical application: (12 hrs)

- 4.1 Alkaloids
- 4.2 Terpenoids
- 4.3 Glycosides
- 4.4 Volatile oils
- 4.5 Tannins and resins.

Unit 5: Systematic pharmacognostic study: Biological source, chemical constituents & uses of following drugs: (15 hrs)

- 5.1 Carbohydrates & Derived Products: Agar, Guar gum, Acacia, Honey, Isabgol, Pectin, Starch, Sterculia & Tragacanth.
- 5.2 Lipids – Beeswax, Castor oil, Cocabutter, Hydnocarpus oil, Cod liver oil, Shark liver oil, Linseed oil, Wool fat.
- 5.3 Fibres & Pharmaceutical Aids: Cotton, Silk, Wool, Glasswool, Asbestos, Talc, Kaolin, Bentonite, Gelatin, Natural colors.

Unit 6: Occurrence, distribution, organoleptic evaluation, chemical constituents including tests wherever applicable and therapeutic efficacy of following categories of drugs.

(35 hrs)

- 1) **Laxatives**- Aloes, Rhubarb, Castor oil, Ispaghula, Senna.
- 2) **Cardiotonics**- Digitalis, Arjuna.
- 3) **Carminatives & G.I. regulators**- Umbelliferous fruits, Coriander, Fennel, Ajowan, cardamom, Ginger, Black pepper, Asafoetida, Nutmeg, Cinnamon, Clove.
- 4) **Astringents**- Catecheu.
- 5) **Drugs acting on nervous system**- Hyoscyamus, Belladonna, Aconite, Ashwagandha, Ephedra,
- 6) Opium, Cannabis, Nux -vomina.
- 7) **Antihypertensive**- Rauwolfia.
- 8) **Antitussives**- Vasaka, Tulsi.
- 9) **Antirheumatics**- Guggal, Colchicum.
- 10) **Antitumour**- Vinca.
- 11) **Antileprotics**- Chaulmoogra oil.
- 12) **Antidiabetics**- Pterocarpus, Gymnema sylvestro.
- 13) **Diuretics**- Gokhru, Punarnava.
- 14) **Antidysenterics**- Ipecacuanha.
- 15) **Antiseptics and disinfectants**- Neem, Curcuma.
- 16) **Antimalarials**- Cinchona.
- 17) **Oxytocics**- Ergot.
- 18) **Vitamins**- Shark liver oil and Amla.
- 19) **Perfumes and flavoring agents**- peppermint oil, Lemon oil, Orange oil, lemon grass oil, sandalwood.

Unit 7: Pharmaceutical aids**(10 hrs)**

- Honey,
- Arachis oil,
- starch,
- kaolin,
- pectin,
- Olive oil.
- Lanolin,
- Beeswax,
- Acacia,
- Tragacanth,
- sodium Alginate,
- Agar,
- Guar
- Gum,
- Gelatin.

Unit 8: Miscellaneous**(20 hrs)**

- Liquorice, Garlic, picrorhiza, Dirscorea, Linseed, shatavari, shankpushpi, Tobacco.
- Collection and preparation of crude drugs for the market as exemplified by Ergot, opium, Rauwalfia, Digitalis, senna.
- Study of source, preparation and identification of fibers used in sutures and surgical dressings-cotton, silk, wool and regenerated fibers.
- Gross anatomical studies of-senna, Datura, cinnamon, cinchona, fennel, clove, Ginger, Nuxvomica & ipecacuanha.

PRACTICAL**(78 hrs)**

1. Identify drugs by morphological characters. Physical and chemical tests for evaluation of drugs wherever applicable.
2. Conduct the gross anatomical studies (t.s.) of the following drugs: Senna, Datura, cinnamon, cinchona, coriander, fennel, clove, Ginger, Nux-vomica, Ipecacuanha.
3. Morphology of Mentha, Lemongrass, Nutmeg and chenopodium.
4. Morphology of Turmeric, Ginger, Eucalyptus.
5. Morphology and microscopy of Coriander and Cinnamon.
6. Morphology and microscopy of Dill and Caraway.
7. Morphology and microscopy of Cardamom and Fennel.
8. Morphology and microscopy of Clove and to study its transverse section.
9. Morphology and microscopy of Bentonite, Gelatin and natural colours (Saffron).
10. Conduct the chemical tests of Pectin, Starch and Honey.
11. To determine the swelling factor of Isapaghula husk.
12. Physical characteristics of Castor oil, Cod-liver oil, Shark-liver oil and Linseed oil.
13. Perform the chemical tests of Asafoetida.
14. Prepare reagents for the chemical tests of Alkaloids and to perform the chemical tests on any Alkaloid containing drug.

15. Test for identification of Glycosides (Saponin and Anthraquinone).
16. Test for identification of Tannins.
17. Test for identification of Steroids.
18. Test for identification of Flavonoids.
19. Identify unorganized drugs: Khadir, Kumari, Babul and Guduchi Satva.
20. Prepare Herbarium Sheets of atleast 5 Ayurvedic Drugs.

Reference Books:

1. Trease G.E., & Evans W.C., "Pharmacognosy", Elsevier Publishers, New Delhi.
2. Tyler V.E. et al "Pharmacognosy" Lea & febiger, Philadelphia.
3. Wallis, T.E. "Text Book of Pharmacognosy" CBS Publisher & Distributor, New Delhi.
4. Kokate C.K. et al "Pharmacognosy" Nirali Prakashan, Pune.
5. Atal C.K. & Kapur BM, "Cultivation & utilization of Medicinal plant, RRL, Jammu.
6. Harborne J B, Phytochemical methods, Chapman & Hall International Edition, London U.K.
7. Mohammed Ali," Pharmacognosy & Phytochemistry" Second Edition CBS Publisher & Distributor, New Delhi,

Health Education and Health Care System

Total: 156 hrs (4 hrs/week)

Theory total: 117 hrs (3 hrs/week)

Practical total: 39 hrs (1 hrs/week)

Full marks: 100 (Th. 75+Pr. 25)

Course Descriptions

This course is designed to acquaint students with knowledge and skills about the health education and health care system of Nepal. It also deals about national health policies, federal structures and its components, current situation of global and national health, major health issues, health related human resources and contribution of health related organization in health sector of Nepal.

Course Objectives

After completion of course, student will be enabled to:

1. Explain the concept of health and scope of health education
2. Find out needs of health education related to pharmacy for individual and the community
3. Apply different health education methods and media to increase adherence to medication
4. Define primary health care and identify health related organization of Nepal
5. Identify the prevalence, principles and components of health care systems of Nepal
6. Find out health related human resources produced from different institutions
7. Describe global health situation and major health issues of Nepal
8. Identify national health programs and explain about national health policy

Theory

Unit 1: Health Education

26 hrs

- 1.1. Concept of Health
 - 1.1.1. Health
 - 1.1.2. Promotive, preventive, curative and rehabilitative
 - 1.1.3. Concept, cause and prevention of disease
 - 1.1.4. Level of prevention
 - 1.1.5. Factors that influence health
- 1.2. Principles and Scope of Health Education
 - 1.2.1. Scope of health education
 - 1.2.2. Principles of health education
 - 1.2.3. Importance of health education in pharmacy
 - 1.2.4. Health education needs related to pharmacy

Unit 2: Learning

6 hrs

- 2.1. Learning
- 2.2. Different way of learning
- 2.3. Change process: concept, need for change, hindrance of change
- 2.4. Factor-affecting learning
- 2.5. Biological factors such as condition of sensory organs

- 2.6. Physical factors
- 2.7. Socio-culture factors
- 2.8. Physiological factors

Unit 3: Health Education Methods and Media

16 hrs

- 3.1. Health education methods
- 3.2. Role of different methods for providing health education
- 3.3. Different methods with advantages and disadvantages
 - 3.3.1. Individual method: Interview and Counseling
 - 3.3.2. Group method: Group discussion, role-play, brain storming, work-shop etc
 - 3.3.3. Mass Method: Lecture, exhibition etc
- 3.4. Health education media
 - 3.4.1. Classification of different health education media
 - 3.4.2. Advantages and disadvantages of each media
 - 3.4.3. Criteria for the selection of media
- 3.5. Planning of health education
 - 3.5.1. Concept and importance of planning
 - 3.5.2. Steps of planning
 - 3.5.3. Health education program planning process
 - 3.5.4. Health education program implementation
 - 3.5.5. Health education program evaluation and differentiate formative and summative evaluation
 - 3.5.6. Health education program evaluation process

Unit 4: Health Care System in Nepal

29 hrs

- 4.1. Primary Health Care
 - 4.1.1. Alma-ata declaration
 - 4.1.2. Concept of primary health care
 - 4.1.3. Primary health care definition
 - 4.1.4. Principles of primary health care
 - 4.1.5. Elements of primary health care
 - 4.1.6. Implementation of PHC (in terms of WHO and government of Nepal)
- 4.2. Health Care System in Nepal
 - 4.2.1. History, cultural values and development of health care systems in Nepal
 - 4.2.2. Without system: Dhama, Jhankri, Lama, Guvaju etc
 - 4.2.3. With system: Ayurveda, Allopath, Homeopathy, Unani, Chinese Medicine, Naturopathy
 - 4.2.4. Philosophy, origin, strengths and weaknesses of the following health care systems:

Ayurveda,	Allopathy,	Homeopathy,	Unani,
Chinese Medicine,	Naturopathy,	Yoga\ Meditation,	Sowarigpa
Other traditionally used healing systems			
- 4.3. Organogram of Ministry of Health and Population (MoHP), federal structure and its component

Unit 5: Health Related Organizations **10 hrs**

- 5.1. National NGOS: FPAN, Nepal Netrajyoti Sangh, Leprosy relief association and others; their roles & activities for promoting health care
- 5.2. International non-governmental organizations (INGO's): roles & activities of INGO's for promoting health care in Nepal
- 5.3. Roles and activities of different bilateral and multilateral agencies: WHO, UNICEF, UNDP, World Bank, DFID, UNFPA and FAO in health sectors of Nepal
- 5.4. Role of Ministry of Health and Population, Department of Health, Department of Ayurveda, NHRC, NARTC, NHTC, DDA in promoting health sectors of Nepal

Unit 6: National Health Policy **6 hrs**

- 6.1. Health in the constitution of Nepal
- 6.2. National Health Policy 2071: vision, mission, goal, objectives, policy and strategy
- 6.3. National Ayurveda Health Policy 2052: vision, mission, goal, objectives

Unit 7: National Health Programs **12 hrs**

- 7.1. Objectives and activities of the following national health programs
Malaria control, FP and MCH, EPI, Tuberculosis control,
Leprosy control, CDD, ARI, Kala-azar,
STD/HIV/AIDS, PHC outreach clinic, Nutrition,
IEC, Trainings
- 7.2. Current five-year plan and long term health plan, potential barriers
- 7.3. Current National Health Sector Support Program
- 7.4. Concept of Millennium Development Goal on health
- 7.5. Role of the Ayurveda dispensary in national health programs

Unit 8: Health Human Resources in Nepal **6 hrs**

- 8.1. The purposes and activities of the various institutions involved in development of Ayurveda human resources:
Institute of Medicine, TU, NSU, CTEVT, NARTC
BPKIHS, NHTC and others
- 8.2. Existing human resources of health sector:
Ayurvedadoctor, Medical doctor, Public health worker, Ayurveda health assistant, Health assistant, Staff nurse, Lab Technologist, Radiographer, Auxiliary Ayurveda workers, Auxiliary nurse midwife, Auxiliary health worker and others
- 8.3. Role & responsibilities of Ayurveda staffs in government institutions

Unit 9: Health Issues & Professional Practice **6 hrs**

- 9.1. Global health situation: current global health issues, mortality from infectious diseases & nutritional problems in developing nations, major health problems
- 9.2. Barriers to the development of global health throughout the world, global efforts to improve the health and nutrition of developing nations.
- 9.3. Major health issues of Nepal
- 9.4. Formation, activities & functions of Nepal Ayurveda Medical Council and NHPC, ethics and oath of health practitioner

- 9.5. Goals and process of small business establishment for community welfare, business opportunities to meet community needs, ethical considerations of entrepreneurship
- 9.6. Common problems encountered during professional practice and its possible solutions

Practical 39 hrs

Unit 1: Health Education

- 1.1. Educational diagnosis survey (Ayurveda hospital or DAHC or AA) 6 hrs
- Select topic of interest
 - Prepare Knowledge, Attitude and Practice (KAP) questionnaire
 - Collect data from patients
 - Analyze and interpret data
 - Find out problem
 - Prioritize problems
- 1.2. Preparation of a plan 4 hrs
- Prepare a plan for the development of a health education action project based on results of the health education survey
- 1.3. Organization and assessment
- Organize and conduct a health education action project and assess the effectiveness of it
- 1.4. Demonstration of different methods of presentation 4 hrs
- Prepare subject or text
 - Present those texts by using different health education methods
- 1.5. Demonstration of operating process of Overhead Projector (OHP) 5 hrs
- Prepare appropriate text in transparencies.
 - Operate overhead projector
 - Deliver that text using mini-lecture method

Unit 2: Health Care System

- 2.1. Health care system with and without system 4 hrs
- Prepare a list of health care system having system
 - List out health care system without system
 - Identify government recognized health care system
- 2.2. Visit and observe health related facilities (DAHC/AA) 2 hrs
- Make a list of health facilities provided
 - Observe activities delivered to the patient and community
 - Identify elements of primary health care

Unit 3: Health Related Organizations 4 hrs

- 3.1. Prepare a list of health related organizations
- 3.2. Make the organizational chart of Department of Ayurveda (DoA), District Ayurveda Health Center (DAHC) and Ayurveda Aushadhalaya (AA)

Unit 4: National Health Policies and Programs 6 hrs
4.1. Compilation of the national health policies and national Ayurveda health policy
4.2. Identify and make a list of currently running national health program

Unit 5: Health Human Resources 4 hrs
5.1. Collect the name of institutions involved in development of Ayurveda human resources
5.2. Find out and make list of available health human resources of Nepal

References Books:

1. Park, J.E. and park, K, textbook of social and preventive medicine (recent edition).
2. Pradhan, H.B., A textbook of Health Education. Educational Resources for Health, 1995.
3. Community Health Nursing.
4. Macmohan, R. et al. WHO current edition, *A guide to management in primary health care*
5. Kamala, T. & Bishnu, R. Health learning materials centre, Tribhuvan University, Kathmandu. 1990. *Leadership and management for nurses.*
6. Warner, D. "Helping Health workers Learn."
7. "Primary Health Care in Nepalese context", Journal of Institute of Medicine, Vol. 1, No. 1, Feb 1979, pp 27 - 49.
8. Quest for Health, Dr. Hemang Dixit, Educational Enterprises, Kathmandu, Nepal.
9. Health and Health Services in Nepal, Y. P. Pradhananga.
10. Documents of National Health Policy, Nepal Ayurveda Health Policy, Drug Policy and Acts, Treatment protocols & Guidelines.
11. Health Service Acts and Regulations, different Health Council Acts and Regulations.

Pharmaceutical Technology

Total: 195 hrs (5 hrs/week)

Full marks: 125 (Th.75+Pr.50)

Theory: 117 hrs (3 hr/week)

Practical: 78 hrs (2 hr/week)

Course Description

This course deals with different dosage forms with their processing, various types of incompatibilities, dose and dosage of drugs. Additionally, it deals with packaging materials, quality control, method of dispensing and brief introduction about cosmetics and toiletries. And finally it deals with the development and testing of new drug carrier systems.

Course objective

After completion of course the student will be able to:

1. Classify different pharmaceutical dosage forms and manufacturing process.
2. Define metrology, converse from one system to another and solve the problems related to percentage and ratio strength and dilution and concentration.
3. Describe the pharmaceutical application of size separation and mixing
4. Explain and understand different types of cosmetics and personal care products
5. Describe the contents of different pharmacopoeias.
6. Explain the pharmaceutical application of drying and explain different dryers.
7. Define comminution and describe comminution principles with example of each.

Theory

Unit 1: Introduction to pharmaceutical preparation and dosage form 10 hrs

- Introduction of different dosage forms.
- Their classification with examples-their relative applications in herbal products.
- Familiarization with new drug delivery systems.

Unit 2: Pharmacopoeias and formularies used in Nepal reference to the Ayurveda 6 hrs

- Introduction to pharmacopoeias and their uses
- Introduce Ayurvedic Pharmacopoeia of India
- Ayurvedic Formulary of India
- Indian Pharmacopoeia

Unit 3: Metrology 7 hrs

- Classify weight and measure
- Calculations including conversion from one to another system.
- Percentage calculations and adjustments of products.
- Use of alligation method in calculations,
- Isotonic solutions

Unit 4: Comminution 6 hrs

- Comminution: objectives of size reduction.
- Factors affecting size reduction.

- Principles of size reduction: description of hammer mill, ball mill, fluid energy mill and colloid mill.

Unit 5: Size Separation **6 hrs**

- Size separation: pharmaceutical applications of size separations.
- Classification of powders as per official standards.
- Size separation by sifting and sedimentation methods.

Unit 6: Mixing and Homogenization **7 hrs**

- Mixing and its pharmaceutical applications.
- Liquid-liquid mixing, semisolid – liquid mixing, Semisolid – solid mixing, Solid - liquid mixing and solid - solid mixing.
- Function of the following mixing equipment:
 - Planetary Mixer
 - Triple Roller Mill
 - Colloid mill
 - Double cone mixer

Unit 7: Filtration and clarification **7 hrs**

- Filtration: theory and pharmaceutical applications of filtration.
- Filter media and filtration aids
- Factors affecting the selection of filters
- Application of the following:
 - Sintered filters.
 - Filters candles.
 - Filter press.

Unit 8: Extraction and Galenicals **5 hrs**

- Extraction: concept of solid-liquid and liquid-liquid extractions.
- Percolation and maceration: modification, continuous hot extraction.
- Application in the preparation of tinctures and extracts.
- Factors affecting the selection of extraction process

Unit 9: Heat Process **6 hrs**

- Definition of heat
- Temperature
- Heat transfer
- Method of heat transfer
- Name of different heat processes
- Evaporation and its pharmaceutical application
- Evaporation still and evaporation pan
- Factors affecting evaporation.

Unit 10: Distillation **7 hrs**

- Differentiation between distillation and evaporation.
- Types of distillation:

- Simple distillation
- Fractional distillation
- Steam distillation
- Vacuum distillation
- Preparation of purified water and water for injection

Unit 11: Drying process **6 hrs**

- Definition of drying
- Pharmaceutical applications.
- Types of dryers :
 - Tray dryer
 - Fluidized bed dryers.

Unit 12: Introduction to Processing of different dosage forms **26 hrs**

- Pills **6 hrs**
 - Types, ideal requirements, classification, granulation methods, general formulation, compression machines, difficulties in preparation, evaluation, sugar coating, film coating, compression coating. Hardness and disintegration of vaties.
- Tablets **6 hrs**
 - Formulation of different types of tablets, granulation technology or large scale by various techniques, physics of tablets making, different types of tablet compression machinery and the equipment employed, evaluation of tablets.
- Capsules **6 hrs**
 - Advantages and disadvantages of capsule dosage form, material for production of hard gelatin capsules, size of capsules, method of capsule filling, soft gelatin, capsule shell and capsule content, importance of base absorption and minimum/gm factors in soft capsules, quality control, stability testing and storage of capsule dosage forms
- Cosmetology and Cosmetic Preparations **8 hrs**
 - Fundamentals of cosmetic science, structure and functions of skin and hair. Formulation, preparation and packaging of cosmetics for skin , hair, dentifrice and manicure preparations like nail polish, Lipsticks, eye lashes, baby care products etc

Unit 13: Monophasic liquid dosage forms **8 hrs**

- Definition of monophonic liquid dosage forms and its advantages and disadvantages.
- Factors affecting solubility.
- Components of formulation with examples
- Preparation of mixtures, Syrup, Elixirs, Linctuses, Drops, Draughts, Gargles, Mouth Washes, Throat paints, Sprays, Enemas, Douches, Ear drops, Nasal drops and sprays, Liniments and Lotions.

Unit 14: Packing of Pharmaceuticals **10 hrs**

- Features of container-types of containers
- Glass and plastics as materials for containers and rubber as a material for closures.
- Merits and demerits glass and plastics
- Introduction to aerosol packaging

Practical

Perform the following tasks:

Unit 1: Prepare Solid dosage forms

78 hrs

- Perform experiments to illustrate preparation, stabilization, physical evaluation of pharmaceutical products like
 - Powders 12 hrs
 - Capsules 14 hrs
 - Tablets 14 hrs

Unit 2: Prepare of liquid dosage forms

- Prepare and supply camphor spirit. 4 hrs
- Prepare and supply strong ginger tincture. 4 hrs
- Prepare and supply root extract of Rheum emboidy (Padamchal). 6 hrs
- Prepare and supply extract of Mentha species (Pudina). 6 hrs
- Prepare and supply thymol / chlorhexidine gargle. 4 hrs
- Prepare and supply calamine lotion. 4 hrs
- Prepare and supply compound sodium chloride mouthwash. 4 hrs
- Prepare simple syrup. 6 hrs

References

1. Gaud. Pharmaceutics, 2003, India.
2. Gaud and Gupta. Practical Pharmaceutics, 2004, India.
3. Gaud and Gupta. Practical Physical Pharmacy, 2004, India.
4. Gaud. Textbook of pharmaceutics, 2004, India.
5. Gupta, A. K. Pharmaceutics: Practical manual (Part I & II), 2004, India.
6. Remington: The Science and Practice of Pharmacy, 20th Edition, Vol I & II.
7. Lachman L Lieberman, H.A. Kanig, J.L., The Theory & Practice of industrial Pharmacy, Lea & Febiger, Philadelphia.
8. Aulton, M.E. Pharmaceutics: The Science of Dosage Form Design ELBS
9. Carter, S.J., Cooper and Gunn's dispensing for Pharmaceutical Students, CBS Publishers, Delhi.

Third year

1. Dravyaguna Vigyana II
2. Rasashastra Tatha Bhaisajya Kalpana II
3. Pharmaceuticals Management
4. Hospital and Clinical Pharmacy
5. Social Pharmacy, Pharmaceuticals Jurisprudence and Toxicology
6. Roga Nidan Tatha Chikitsa
7. Comprehensive Professional Filed Practice

Dravyaguna Vigyan II

Total: 270 hrs (9 hrs/week)

Full marks: 150 (Th.75+Pr.75)

Theory: 120 hrs (4 hr/week)

Practical: 150 hrs (5 hr/week)

Course Description

This course is designed to provide students the knowledge and skills about the Dravyaguna vigyan specially focus on identification, physical as well as chemical properties, actions, indications, parts used and dose of medicinal.

Course Objectives

After the completion of this course, the students will be able to:

1. Explain the sanskrit, latin and local name, family, general introduction, geographical distribution of medicinal plants
2. Describe chemical composition, rasa, guna, veerya, vipaka, prabhava, actions, indications, parts used, doses, common preparations of medicinal plants.
3. Perform organoleptic, physical & chemical tests as well as microscopical examination.
4. Identify locally available medicinal plants and its indication with proper dose

Theory

Unit 1: Medicinal Plants

50 hrs

Sanskrit, Latin and local names, family, general introduction, geographical distribution, chemical composition, rasa, guna, veerya, vipaka, prabhava, actions, indications, parts used, doses & common preparations of the following-

Vasa	Apamarga	Bhallatak	Karkatkshringi	Kutaja	Saptaparna				
Sarpagandha	Vacha Sariva	Daruharidra	Shyonaka	Patala	Shalmali	Guggulu	Varuna		
Jyotishmati	Haritaki	Bibhitaka	Arjuna	Varuna	Bhringaraja	Kustha	Trivrita	Shankhapushpi	
Kushmanda	Patola	Mustaka	Eranda	Amalaki	Tubaraka	Kiratatikta	Changeri	Ushira	
Nagakeshara	Durva	Tulsasi	Tvaka	Aparajita	Yasthimathu	Kapikachhu	Bakuchi		
Kanchanara	Asoka		Aragvadha	Asana					
Shirisha	Khadira	Rasona	Shatavari	Kumari	Dhataki	Bala	Nimba	Guduchi	Patha
Shigru	Jatiphala	Lavanga		Jambu		Punarnava		Devadaru	
Talisapatra	Pippali			Maricha		Chitraka		Dadima	
Bilva	Manjishtha			Madanaphala		Brahmi		Katuki	
Pashanabheda	Kantakari			Brihati		Ashwagandha		Lodhra	
Aguru	Mandukparni	Hingu	Jiraka	Yavani	Dhanyaka	Jatamansi	Tagara		
Nirgundi		Agnimantha	Haridra	Ardraka	Eladwoya	Gokshura			

Unit 2: Brief study of the following medicinal plants

40 hrs

Sanskrit, Latin and local names, general introduction, geographical distribution, chemical composition, rasa, guna, veerya, vipaka, prabhava, indications, parts used, doses & common preparations of following-

Vidanga Ativisha Amra Rohitaka Erandakarkati Sahadevi Damanaka
 Dhugdapheni Jhandu Rasna Vidarikanda Sarshapa Chandrashura Karvellaka Kamila
 Bhumyamalaki Dugdika Somalata Vamsha Kusha Kasha Usheera Durva Shara
 Amlavetasa Tejapatra Methika Raktachandan Bijaka Kulattha Kasamarda Babbul
 Lajjalu Latakasturi Ashwattha Akshotaka Udumbara Kadali Katphala Parijata Jati
 Narikela Upakunchika Shatahwa Beejapura
 Karpoora Kakamachi Chakramarda Dronapushpi Patha Rudraksha Laksha
 Swornapatri Ikshu Gambhari Tanduliyaka Tila Tumburu Dadima Darusita
 Draksha Nimbuka Patola Patala Prasarini Priyangu Prishniparni Babbula
 Barbari Bimbi Brihati Bhurjapatra Mahanimba Mashaparni Mudgaparni
 Munjataka Mushali Shalaparni Sarala Sthauneyaka Trayamana Madanphala
 Soorana Palasha Yarsagumaba Shatahwa Karchura Padamachal Okhara Dhasingare
 Sugandhakokila

Unit 3: Medicinal Plants with Toxicity

10 hrs

Sanskrit, latin and local name, family, general introduction, geographical distribution, chemical composition, rasa, guna, veerya, vipaka, prabhava, actions, toxic effects & antidotes, method of purification, indications, contraindication, parts used, doses, uses & common preparations of following medicinal plants:

Karveera	Arka	Bhallatak	Bhanga	Ahiphena	Vatshanabha
Dhattura	Gunja	Snuhi	Jayapala		

Unit 4: Medicinal of Animal Origion

20 hrs

Introduction, Guna, Karma, useses and dose of following-

Kasturi	Gorochana	Mrigasringa
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Practical

[Dravyaguna-vigyana and Pharmacology (Basic concepts) I and
 Dravyaguna-vigyana and Pharmacology (Medicinal Plants) II]

Herbarium

Field visit

Record file

Viva

Unit 1: Observation and Drawing:

75 hrs

Perform organoleptic test, physical and chemical tests, microscopical examination and drawing of following medicinal plants:

Ashwagandha	Amalaki	Aragvadha	Indrayava	Eranda	Kankola
Katphala	Katuka	Kapikachchhu	Kampillaka	Karkatashringi	Kupilu
Kushtha	Khadira	Guggulu	Guduchi	Gokshura	Chakramarda
Jatamansi	Jyotishmati	Talisapatra	Tumburu	Daruharidra	Dhataki

Nagakeshara	Palasha	Pashanabheda	Pippali	Punarnava	
Babbulaniryasa					
Bakuchi	Bibhitaka	Bilwshalatu	Bhallataka	Bhringaraja	
Bhumyamalaki					
Manjishtha	Madanaphala	Maricha	Mustaka	Mocharasa	Yashtimadhu
Rasanjana	Rohitaka	Laksha	Vacha	Vatsanabha	Varuna
Vasaka	Vidanga	Shatavari	Shirisha	Shunthi	
Vamshalochana					
Saptaparna	Sarjarasa	Sarpagandha	Haridra	Haritaki	Trivrit

Unit 2: Field trip, Report Writing and Herbarium Preparation: 75 hrs

- 2.1: Perform field trip of minimum of 4 days visiting herbarium and herbal gardens or farms and write report on it.
- 2.2: Collect specimens of locally available medicinal plants and prepare herbarium sheets of minimum of 50 medicinal plants included in theory course.

Reference Books:

- Ayurveda Pharmacology (Bheshajaguna Vijnana): Dr. C. R. Sapkota and Dr. S. M. Adhikari, SinghadurbarVaidyakhanaVikasSamiti, Kathmandu, Nepal.
- Pharmacology and Pharmacotherapeutics: Satoskar and Bhandarkar,
- Essential Drug List: Department of Drug Administration, Kathmandu, Nepal.
- Essential Ayurveda Drug List: Department of Ayurveda, Kathmandu, Nepal.
- Standard Treatment Schedules for Health posts & Sub-health posts: Deptt of Drug Administration, Kathmandu, Nepal.
- Chandra Nighantu, SighadarbarVaidhayakhanaBikassamiti

Rasashastra and Bhaisajya Kalpana-II

Total: hrs 270 (9 hrs/week)

Full marks: 150 (Th. 75+Pr. 75)

Theory hrs: 120 (4 hrs/week)

Practical hrs: 150 hrs (5 hrs/week)

Course Description

This course is designed to help students to acquaint with the knowledge and skills on different aspects of Rasashastra & Bhaisajya Kalpana in Ayurveda. Students taking up diploma course in Ayurvedic Pharmacy must have basic knowledge of Rasashastra and Bhaishjya Kalpana an ancient science of alchemy. They must know the classical methods and principles involved in the manufacturing of different Ayurvedic formulations and should also get the practical training of preparing these drugs. They must also know the basic concepts of identification, Collection, manufacturing, storage, preservation and dispensing of Ayurvedic drugs. The syllabus of diploma course includes these aspects of teaching and training.

Course Objectives

After completion of this course the students will be enabled to:

1. Describe the methods and principals of manufacturing different Ayurvedic formulations.
2. Conduct practical training of preparing the drugs.
3. Explain identification & collection, manufacturing, storage, preservation and dispensing of Ayurvedic drugs.

RASA SHASTRA (70 hrs)

Unit 1: Uparasa-

10 hrs

- Introduction / Synonyms, Identification, Types, shodhana, Marana, Therapeutic doses and Compound formulations.

Unit 2: Sadharana rasa

10 hrs

- Introduction / Synonyms, Identification, Types, shodhana, Marana, Therapeutic doses and Compound formulations.

Unit 3: Loha varga

10 hrs

- Introduction / Synonyms, Identification, Types, shodhana, Marana, Therapeutic doses and Compound formulations.

Unit 4: Ratna and Uparatna varga

10 hrs

- Introduction / Synonyms, Identification, Types, shodhana, Marana, Therapeutic doses and Compound formulations.

Unit 5: Sudha and Sikta varga

10 hrs

- Introduction / Synonyms, Identification, Types, shodhana, Marana, Therapeutic doses and Compound formulations.

Unit 6: Visha and upavisha varga

10 hrs

- Introduction / Synonyms, Identification, Types, shodhana, Marana, Therapeutic doses and Compound formulations.

Unit 7Aushadha Yoga

10 hrs

- 7.1. Anandbhairav rasa
- 7.2 .Arogyavardhini rasa
- 7.3. Garbhupal rasa
- 7.4. Gandhakrasayana
- 7.5. Tribhuvankirtirasa
- 7.6. Laxmivilas rasa
- 7.7. Navajivan rasa
- 7.8. Shwaskuthar rasa
- 7.9. Ichchhabhedi rasa
- 7.10. Chandraprabhavati

Bhaisajya Kalpana (50 Hrs.) Part – II

Unit 1: ChurnaKalpana-

5hrs

- 1.1 Introduction
- 1.2 Method of Preparation as per classics,
- 1.3 Size reduction,
 - Objectives
 - Factors affecting size reduction,
 - Methods of size reduction,
- 1.4 Size separation, Sedimentation methods of size separation)
Eg: Hingwashtaka Churna, Sitopaladi Churna
- 1.5 Official standards for powders.

Unit 2: Vati Kalpana-

5 hrs

- 2.1 Introduction
- 2.2 Method of Preparation as per classics,
- 2.3 Varti, Gutika, etc (Ex: Chitrakadi Vati Sanjeevani Vati, Chandrodaya Varti)
- 2.4 Modern aspect of Tablets and Capsules, Suppositories)

Unit 3: Sneha Kalpana

5 hrs

Medicated Oils and Ghee

- 3.1 Introduction
- 3.2 Method of preparation: Sneha siddhi laxana, dose,
- 3.3 Advantages of Snehakalpas etc. Ex: Jyatyadi Taila, Triphala Ghrita.

Unit 4: Sandhana Kalpana

5 hrs

Fermentative Preparations

- 4.1 Introduction
- 4.2 Method of preparation

- 4.3 Significance of fermentative preparations.
4.4 Tests to confirm the onset & completion of fermentation process, Dose and Shelf life (Ex: Dashamularishtha, Kumariasava).

Unit 5: Pathya Kalpana **5 hrs**

Preparations of Diet

5.1 Introduction

5.2 Method of preparation

5.3 Concept of Pathyapathya, Manda, Peya, Vilepi, Anna, Bhakta, Odana, Yusha, Krishara, Mamsarasa, Raga, Shadava, Dadhi, Takra, Udaswita, Mathita etc.

Unit 6: LepaKalpana **5 hrs**

6.1 Types of Lepas,

6.2 Method of Preparation

6.3 Application of Lepas (Herbal Applications), Dashangalepa

Unit 7: SikthaTaila, Malahara, Upanaha& Other Kalpanas **5 hrs**

Ointments, Poultice & other preparations

7.1 Introduction

7.2 Method of preparation of:

- Gandhakadya Malahara,
- Sarjarasa Malahara,
- Atasiupanaha,
- Shatadhouta Ghrita,

Unit 8: KsharaKalpana **5 hrs**

8.1 Introduction

8.2 Types,

8.3 Method of preparation of ApamargaKshara.

8.4 General method of preparation of Kshara sutra.

Unit 9: Modern dosage form **5 hrs**

9.1 Introduction of ointments, creams, gels, lotions, shampoos, soaps, liniments etc.

Unit 10: Arkakalpna **5 hrs**

10.1 Introduction

10.2 Method of preparation of arka like Ajmodaarka, uses, shelf life etc.

Practical: **150 hrs**

Practical (No. 1 to 19 – Rasa Shastra & No. 20 to 40 – Bhaishajya Kalpana)

Rasa Shastra

1. Gandhaka Shodhana – 4 Hrs.
2. Gairika Shodhana – 3 Hrs.
3. Kasisa Shodhana – 4 Hrs.
4. Kankshi Shodhana – 4 Hrs.

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|------------------------|----------|
| 5. Hartala Shodhana | – 4 Hrs. |
| 6. Manahshila Shodhana | – 4 Hrs. |
| 7. Hingula Shodhana | – 4 Hrs. |
| 8. Kapardika Shodhana | – 4 Hrs. |
| 9. Mandura Shodhana | – 4 Hrs. |
| 10. Loha Shodhana | – 4 Hrs. |
| 11. Tamra Shodhana | – 4 Hrs. |
| 12. Naga Shodhana | – 4 Hrs. |
| 13. Vanga Shodhana | – 4 Hrs. |
| 14. Yashada Shodhana | – 4 Hrs. |
| 15. Shankha Shodhana | – 3 Hrs. |
| 16. Shukti Shodhana | – 3 Hrs. |
| 17. Praval Shodhana | – 3 Hrs. |
| 18. Godanti Shodhana | – 3 Hrs. |
| 19. Tankana Shodhana | – 3 Hrs. |

Bhaishajya Kalpana

- | | |
|---------------------------------------|----------|
| 20. Preparation of Vasavaleha | – 3 Hrs. |
| 21. Preparation of Chavyanprasavaleha | – 4 Hrs. |
| 22. Preparation of Guduchi Ghana | – 4 Hrs. |
| 23. Preparation of Haridra Khanda | – 4Hrs. |
| 24. Preparation of Amrita Sattva. | – 4 Hrs. |
| 25. Preparation of Ardraka Sattva. | – 4 Hrs. |
| 26. Taila Murchhana | – 3 Hrs. |
| 27. Ghrita Murchhana | – 3 Hrs. |
| 28. Preparation of Chandrodaya Varti | – 4 Hrs. |
| 29. Preparation of Arka Lavana | – 4 Hrs. |
| 30. Preparation of Triphala Masi | – 4 Hrs. |
| 31. Preparation of Apamarga Kshara | – 3 Hrs. |
| 32. Preparation of Kanji | – 4 Hrs. |
| 33. Preparation of Tandulodaka | – 4 Hrs. |
| 34. Preparation of Kutjarishta | – 4 Hrs. |
| 35. Preparation of Kanakasava | – 4 Hrs. |
| 36. Preparation of Kumari Asava | – 4 Hrs. |
| 37. Vatsanabha Shodhana | – 4 Hrs. |
| 38. Kupilu Shodhana | – 4 Hrs. |
| 39. Bhallataka Shodhana | – 4 Hrs. |
| 40. Gunja Shodhana | – 4 Hrs. |

Reference Books:

1. Chaturbhuja Mishra, *Rasa Hrdaya Tantram*, Mugdhavbodhini Commentory, Chaukhamba publishers, Varanasi.
2. Indradev Tripathi, *Rasarnava*, Rasachandrika Hindi commentary, Choukhamba Sanskrita Series, Varanasi.
3. Siddhinandan Mishra, *Rasendra Chudamani*, Siddhiprada Hindi commentary, Choukhamba Orientalia, Varanasi.
4. Siddhinandan Mishra, *Anandakanda*, Siddiprada commentary, Choukhamba Orientalia, Varanasi.
5. D. A. Kulkarni, *Rasaratna Samuchchaya*, Vijnanabodhini Hindi commentary, Meharchanda Lachhmandas Publications, New Delhi.
6. Indradev Tripathi, *Rasendra Sara Sangraha*, Rasavidyotini Hindi Commentory, Chaukhamba Orientalia, Varanasi.
7. Gularajsharma Mishra, *Ayurveda Prakasha*, Artha Prakashini Hindi commentary, Choukhamba Bharati Academi, Varanasi.
8. Lakshmipatishastri, *Yogaratnakara*, Vidyotini Hindi commentary, Choukhamba Sanskrit Sansthan, Varanasi.
9. Hariprapanna Sharma, *Rasa Yoga Sagara*, Chaukhamba Krishnadas Academy, Varanasi.
10. Sharma Sadanand, *Rasatarangini*, Rasavigyana Hindi commentary, Motilal Banarasidas Publication, Delhi.
11. Sri Siddinandana Mishra, *Ayurvediya Rasashastra*, Chaukamba Orientalia, Varanasi.
12. Acharya Sharangadara, edited by Shrikanthamurthy KR. *Sharangadara Samhita*, Varanasi: Chaukhamba Orientalia.
13. Sharangadhara, *Sharangadhara Samhita*, Pandit parshuram shastri vidyasagar, Chaukhamba Orientalia.
14. Govind Das, *Bhaishajya Ratnavali*, Hindi commentary by Ambikadatta Shastri, Varanasi: Chaukambha Prakashan.
15. G S lavekar et al, Database on Medicinal Plants used in Ayurveda and Siddha, Central Council for Research in Ayurveda and Siddha, Department of Ayush, Ministry of Health and Family Welfare, Government of India, New Dehli.

Pharmaceutical Management

Total: 150 hrs (5 hrs/week)

Full Marks: 100 (Th.50+Pr.50)

Theory: 90 hrs (3 hrs/week)

Practical: 60 hrs (2 hrs/week)

Course Description

This course is designed to equip students with the knowledge and skills on business organization and management, economic theory and financial management. The course is also focused on management of a community Ayurvedic pharmacy, management of Ayurvedic Medicine supply and pharmaceutical marketing.

Course Objectives

After completing the course the student will be able to:

1. Develop general concept of business organization and management.
2. Apply economic theory to pharmaceuticals.
3. Develop basic managerial skills and financial management skills applicable in pharmaceutical sectors.
4. Develop concept of marketing skills and apply them in the pharmaceutical sector.
5. Manage community pharmacy.

Theory

Course Contents

Unit 1: General concept of management **10 hrs**

- 1.1 Concept of management: process, discipline and characteristics.
- 1.2 Major management functions in brief.
- 1.3 Management and administration distinguishing.
- 1.4 Management skills and abilities.
- 1.5 General principles of management in brief, Taylor's scientific management theory.
- 1.6 Planning and organizing
- 1.7 Nature and process of controlling.
- 1.8 Decision-making.
- 1.9 Direction and motivation. Maslow's theory of motivation
- 1.10 Leadership and supervision.

Unit 2: Entrepreneurship and Pharmaceutical Organization **4 hrs**

- 2.1. Entrepreneurship, general characteristics of entrepreneur and its types
- 2.2. Business organization in pharmaceutical enterprises (industry, trade, hospital and Community).

Unit 3: General concept on economic theory with focus to pharmaceuticals **10 hrs**

- 3.1 Economics (Adam Smith and Robin's definition) and pharmaco-economics
- 3.2 Market economy and its types
- 3.2 Theory of demand.
- 3.3 Consumer behavior.

- 3.4 Revenue and cost curves.
- 3.5 Theory of price and output determination in perfect competition and monopolistic market
- 3.6 Public finance
- 3.7 Taxation and its types

Unit 4: Pharmaceutical Finance and Accounting management 10 hrs

- 4.1 General concept of cost and cost accounting.
- 4.2 General concept of Journal Voucher, Ledger, Trial Balance and Balance Sheet.
- 4.3 Concept of capital and capital management.
- 4.4 Calculation of turnover, working capital, Income statement, cost volume profit analysis and investment return ratios.
- 4.5 Break-even point with graphical and mathematical calculation

Unit 5: Drug Supply Management in Public Sector 10 hrs

- 5.1 General concept on Essential medicine and essential medicine list, selection criteria for essential medicine list
- 5.2 Standard Treatment Schedule and its importance
- 5.3 Quantification techniques for medicine procurement
- 5.2 Procurement cycle: Purchasing procedure including tender procedures.
- 5.3 Storage of medicines including vaccines.
- 5.4 Distribution system of medicine for outreach supply
- 5.5 Monitoring process in distribution of medicine
- 5.6 Rational drug use and explain its importance

Unit 6: Pharmaceutical marketing 20 hrs

- 6.1 Market and its types
- 6.2 General concepts on elements of marketing
- 6.3 General concept on creation of demand for pharmaceutical goods
- 6.4 Basic concept of Marketing and marketing management (traditional and modern concept) i.e. production, product, sales marketing and societal marketing.
- 6.5 Marketing segmentation of pharmaceuticals: marketing segmentation, target marketing, product positioning, tools of product differentiation.
- 6.6 Marketing mix: elements of marketing mix
- 6.7 Marketing process
- 6.8 General concept on sales promotion
- 6.9 Product and Pricing Decision of pharmaceutical:
 - New product development,
 - Decisions relating to product:
 - Product mix and product line decisions
 - Branding and packing decision
 - Product pricing
- 6.10 Product promotion and Modern marketing of pharmaceuticals:
 - a) Definition and promotional decision including personal selling, designing of promotional materials, advertising and sale promotion, public relation, personal selling.

- b) Introduction to export marketing globalization, web marketing, green marketing, network marketing, event marketing.
- 6.11 Tactics in detailing on pharmaceutical products

Unit 7: Human Resource Management in Pharmaceuticals

6hrs

- 7.1 Basic concept of Human resource management
- 7.2 Components of HRM(Recruitment and selection):
 - a) Concept, process, source
 - b) Process of selection, interview.
 - c) Placement: orientation, socialization]
- 7.3 Motivation and training for HRM

Unit 8: Dispensary Management:

20hrs

- 8.1 Ayurveda dispensary management:
 - Components
 - Objectives
 - Terms, responsibilities and importance
- 8.2 Training:
 - Purpose and the process for assessing the need for training (TNA)
 - Types of training with advantage and disadvantages of each type of training,
 - Planning
 - Conducting& evaluation of training program
- 8.3 Staff meeting:
 - Importance
 - Planning date, time, venue, participants, resources and invitation,
 - Procedures for conducting/organizing a meeting.
- 8.4 Purpose and procedures for financial management,
 - records of income and expenditure,
 - annual budget, bank account,
 - Prepare monthly/quarterly and annual financial statements.
- 8.5 Employee leaves:
 - Types,
 - Procedure for making a request for leave,
 - Approval of staff leave and maintaining the records of staff leave.
- 8.6 Logistic management:
 - purpose,
 - functions,
 - logistic cycle and Six” rights of the logistics management,
 - Components & procedures of Nepal’s LMIS.
- 8.7 Process of quality assurance, patient/staff needs performance, reality and team approach.
- 8.7 Benefits of regular staff performance evaluations
 - Importance of writing a clear and complete staff job description
 - Job assignment,
 - Indicators of a good job performance.
- 8.8 Workspace required for various Ayurveda dispensary activities

- Strategies for management of activities
 - Ways to arrange space as per activities.
- 8.9 Time management:
- Time management and calendar of operation,
 - Weekly, monthly, quarterly and yearly program
 - Chart preparation for various activities.
- 8.10 Problem and problem solving: steps of problem solving.
- 8.11 Health Management Information System (HMIS): purpose, process, types, importance.
- 8.12 Aurveda Management Information System (AyMIS): purpose, process, types and importance.
- 8.13 Drug information and drug information bulletin

Practical **60 hrs**

Unit 1: Pharmaceutical organization & management **15 hrs.**

- 1.1 Prepare organogram of pharmaceutical industry.
- 1.2 Prepare a marketing plan for the given product of pharmaceutical products.

Unit 2: Financial management in pharmaceutical sectors **15 hrs.**

- 2.1 Calculate turnover, working capital, Income, cost volume, profit and investment return ratios.
- 2.2 Perform break-even point with graphical and mathematical calculation

Unit 3: Management of Different Pharmaceutical product **7 hrs.**

- 3.1 Prepare a survey report on the market of the given pharmaceutical product in different location.

Unit 4: Ayurveda Dispensary Management: **8 hrs**

- 4.1 Conduct/organize staff meeting.
- 4.2 Prepare monthly/quarterly and annual financial statements.

Unit 5: Perform the following: **15 hrs**

- 5.1 Fill the HMIS Report.
- 5.2 Fill different Formats of Currently used Ay HIMS Reports.

Reference Books:

1. Managing Drug Supply, Published by HMG, DHS/MoH.
2. Health Management, Y. P. Pradhananga, CTEVT, Bhaktapur
3. Leadership & Management for Nurses, Kamala T. & Bishnu R., Health Learning Materials Centre, TU.
4. Documents of National Health Policy, Nepal Ayurveda Health Policy, Drug Policy and Acts, Treatment protocols & Guidelines.
5. Health Service Acts and Regulations, different Health Council Acts and Regulations
6. On Being Incharge, A guide to Management in Primary Health Care: Macmohan R. et al. WHO.

Hospital and Clinical Pharmacy

Total: 150 hrs (5 hrs/week)

Theory: 90 hrs (3 hrs/week)

Practical: 60 hrs (2 hrs/week)

Full marks: 100 (Th. 50+Pr. 50)

Course description

This course enriches the students with the knowledge and skills for managing the pharmacy department of hospital and community pharmacy. Hospital pharmacy focuses on drug distribution system in Ayurveda and other hospitals, extemporaneous preparations, inventory management, nomenclature and uses of surgical instruments and hospital equipment and drug monitoring. Similarly, clinical pharmacy focuses drug Interactions, adverse drug reaction, therapeutic drug monitoring, and concept of patient counselling, store handling and rational dispensing.

Course Objectives

After completion of this course students will be able to:

1. Handle pharmacy department of hospital for providing the services to outpatient department and in-patient department.
2. Provide the patient counselling services for rational drug use.
3. Familiarize with Ayurvedic drug and their rational use.
4. Familiarize with drug procurement system in hospitals.
5. Familiarize with Pharmacovigilance programme
6. Prepare some common Ayurvedic and Allopathy preparation in hospital.
7. Manage of drugs and store
8. Familiarize with common laboratory and diagnostic tests

Part A: Hospital Pharmacy

Unit 1: Hospitals

3 hrs

- 1.1. Hospital and its function
- 1.2. Classification of hospitals based on various criteria
- 1.3. Organization, management
- 1.4. Delivery system in Nepal.

Unit 2: Hospital Pharmacy

7 hrs

- 2.1 Introduction
- 2.2 Functions and objectives of hospital pharmacy services
- 2.3 Layout design of hospital with flow of materials and men
- 2.4 Layout design of Ayurveda Aushadhi Utpadankaksha (Ayurveda drug manufacturing Unit) with flow of materials and men
- 2.4 Regulatory and professional requirement for hospital pharmacy practice
- 2.5 Requirements and abilities required for hospital pharmacists

Unit 3: Drug distribution system in hospital

8 hrs

- 3.1 Drug distribution system in hospitals with emphasis on:
 - Outpatient services
 - In-patient services

- Types of services.
- Detailed discussion of unit dose system.
- Floor/ward stock system.
- Satellite pharmacy system.
- Bedside pharmacy.

Unit 4: Central sterile services. 2 hrs

- 4.1 Functions and objectives of CSSD,
- 4.2 Role of pharmacist in CSSD,
- 4.3 Flow chart of CSSD

Unit 5: Extemporaneous compounding and dispensing 10hrs

- 5.1 Definition, manufacturing requirement, scope and limitations
- 5.2 Some common hospital formulations:
 - Salicylic acid ointment
 - Coal tar ointment
 - Whitefield ointment
 - Iodine solution
- 5.3 Some common hospital Ayurvedic formulations:
 - Triphalachurna,
 - Sitopaladichurna,
 - amalakichurna,
 - Ashwogandhachurna,
 - Satavarichurna,
 - Vataritel,
 - ArsoghnaMalham,
 - Vasabaleha,
 - Locally availableekaldravya (Single drug) etc.
- 5.4 Concept of Total Parenteral nutrients.

Unit 6: General concept on Surgical and Sterilization 8 hrs

- 6.1 Surgical dressing cotton, gauze, bandages and adhesive tapes, Sutures, I.V. sets, Ryle's tubes, Catheters, Syringes.
- 6.2 Health Accessories
- 6.3 Nomenclature and uses of surgical instruments and equipments and health accessories used in Ayurveda Surgery
- 6.4 AshtavidhaShastra-karma, suturing methods
- 6.5 Kshara and Kshara-karma, Ksharakarma-sadhyaVyadhi, Ksharanirmanavidhi, Kshar Sutra, Kshara-dosha, Kshara-prayoga-vidhi and the process of preparation and use.
- 6.6 Sterilization

Unit 7: Drug Store management 8 hrs

- 7.1 Essential Ayurvedic drugs list, concept and importance
- 7.2 Demand Estimation for procurement of drug supplies

7.3 Requirement for drug storeroom and storage requirement of general drugs including vaccines and narcotic drugs	
7.4 Requirement for drug storeroom and storage requirement of Ayurvedic drugs	
7.5 Principle of drug inventory management: ABC analysis, VED Analysis, FSN analysis, FIFO, FEFO.	
7.6 Handling of cytotoxic drugs and radioisotopes	
Unit 8: Principle of appropriate dispensing of drug	4 hrs
8.1 Care during drug use	
8.2 Posology – Dose and dosage of drugs.	
8.3 Dose of drug (Vaya, Bala, Linga, Dosh, Agni, Vyadhi, Kostha, DravyaPrakriti, Avyas, kalpanadibhedetc), Anupan, Sahapanvyavastha, Pathyapathya, Savadhani, Nishedha, BhesajKaal,BhesajPrayogBidhi, Marg.	
8.4 Aushadhivyabastha, OPD/IPD aushadhivyavastha	
Unit 9: Application of computers in Pharmacy	5 hrs
9.1 Application of computers in maintenance of records	
9.2 Inventory control	
9.3 Medication monitoring	
9.4 Drug information and data storage	
9.5 Retrieval in hospital and retail pharmacy establishments	
Part B: Clinical Pharmacy	
Unit 1: Introduction	4 hrs
1.1 Introduction	
1.2 Clinical pharmacypractice	
1.3 Elements of pharmaceutical care	
Unit 2: Taking Medication History	4 hrs
2.1 Demographic information,	
2.2 Dietary information,	
2.3 Social habits,	
2.4 Current and Past Prescription Medications,	
2.5 Current and Past Non-prescription,	
2.6 Medication Allergies, ADR	
Unit 3: Drug Interactions	6 hrs
3.1 Definition	
3.2 Mechanism of drug interaction with examples	
3.3 Drug-food interaction with examples	
Unit 4: Adverse drug reaction	4 hrs
4.1 Adverse drug reactions,	
4.2 Type of ADR	
4.3 ADR monitoring and pharmacovigilence	
4.4 Some drug induced diseases and teratogenicity.	

Unit 5: Dispensing aspects **6 hrs**

- 5.1 Pharmacists and Patient counseling and advice for the use of common drugs
- 5.2 Proper use of medication
- 5.3 Common daily terminology used in the practice of Medicine
- 5.4 Drug utilization review, medication profiles, non-prescription drug usage, health education

Unit 6: Therapeutic Drug Monitoring **4 hrs**

- 6.1 Therapeutic Drug Monitoring
- 6.2 Importance of monitoring
- 6.3 Techniques of monitoring
- 6.4 Drug monitoring with special focus on narrow therapeutic index and its range.

Unit 7: Drugs used in Special population **3 hrs**

- 7.1 Pregnancy
- 7.2 Lactation
- 7.3 Pediatrics
- 7.4 Geriatrics
- 7.5 Hepatic and Renal diseases

Unit 8: Prescriptions **4 hrs**

- 8.1 Reading and understanding of prescriptions,
- 8.2 Latin terms commonly used Modern methods of prescribing
- 8.3 Classical system of measurement in Ayurveda
- 8.4 Adoption of metric system.
- 8.5 Calculations involved in dispensing.
- 8.6 Incompatibilities in Prescriptions.

Practical **60 hrs**

1. Prepare different extemporaneous preparation and dispensing.
 - a. Some common hospital formulations:
 - Salicylic acid ointment
 - Coal tar ointment
 - Whitefield ointment
 - Iodine solution
 - b. Some common hospital Ayurvedic formulations:
 - Triphalachurna,
 - Sitopaladichurna,
 - amalakichurna,
 - Ashwogandhachurna,
 - Satavarichurna,
 - Vataritel,
 - ArsoghnaMalham,

- Vasabaleha,
 - Locally availableleekaldravya (Single drug) etc.
2. Kshar Sutra Nirman (Manufacturing)
 3. Sterilize surgical instruments, glassware and hospital supplies.
 4. Familiarize with different sutures, catheters, Ryle's tube, ET tube, IV sets, and blades.
 5. Observe suturing, suture removing, dressing, bandaging, plaster cutting and draining of abscess.
 6. Dispense Pharmacy in OPD/IPD for two days in a week.
 7. Identify and note the organoleptic characters and uses of at least 30 yogas seen in the OPD/IPD.
 8. Interpret of Common laboratory values
 9. Handle/Use of Glucometers, BP set, Insulin Devices, Inhaler, Rotahalers, pregnancy test kits, ECP.
 10. Handle and use data processing software and equipment.
 11. Administer and counsel special dosage forms; suppository, eye and ear drop, Nebulizer, Metered dose inhaler and Insulin devices.

References

1. Remington's Pharmaceutical Sciences.
2. Martindale's Extra Pharmacopoeis.
3. Textbook of Hospital and clinical pharmacy, Dandiya, P. C., Mathur, Mukul, VallabhaiPrakashan.
4. Ayurvedic Yantra Shastra Parichaya, Surendra Mohan, MotilalBanarasidas, Varanasi, India.
5. DravyaGunaVigyan, Prof. Dr. Shyam Mani Adhikari
6. Good manufacturing practice guideline of Ayurveda. Department of drug administration.
7. A clinical protocol of Ayurveda hospital, Department of Ayurveda
8. WHO publication on Hospital and clinical Pharmacy.
9. Hospital Pharmacy Service Guidelines 2070 published by Government of Nepal, Ministry of Health and Population.

Social Pharmacy, Pharmaceutical Jurisprudence and Toxicology

Total: 150 hrs (5 hrs/week)

Theory total: 90 hrs (3 hrs/week)

Full marks: 100 (Th. 50+Pr. 50)

Practical total: 60 hrs (2 hrs/week)

Course Description

This course is designed to help students to acquaint with the knowledge and skills on different aspects of community Pharmacy in Ayurveda. This course focuses on the different ethical aspects of pharmacy and different components of the community pharmacy. It also helps students to acquaint with the knowledge and skills on different regulatory provision in the drug administration as well as related regulations of Nepal and basic differences on the regulatory provisions of India.

Course objectives

After completion of this course the students will be able to:

4. Describe different aspects of community pharmacy and community pharmacy management.
5. Develop communication skill and dispensing technique.
6. Process new and refill prescription orders
7. Describe the provision of drug laws and their regulations.
8. Explain drug policy.
9. Discuss the banned drugs and pharmaceutical ethics.
10. Introduce agada/poisons
11. Differentiate different types of visa, upavisa and their effects.

Theory

Part One: Social Pharmacy

Unit 1: Social pharmacy

5 hrs

- 1.1 Profession & professionalism.
- 1.2 Pharmacy as profession.
- 1.3 Role of community pharmacy in the society, Primary Health Care, public health
- 1.4 Different component of prescription
- 1.5 Pharmaceutical abbreviations
- 1.6 Different steps of dispensing of prescription and dispensing techniques.
- 1.7 Pharmaceutical calculations.
- 1.8 Extemporaneous dispensing.
- 1.9 Labeling of dispensed products.
- 1.10 Patient counseling.
- 1.11 Patient compliance.
- 1.12 Patient profile.
- 1.13 Drug profile.

Unit 2: Management of a community pharmacy

4 hrs

- 2.1 Location analysis.
- 2.2 Establishing and financing a community pharmacy.

- 2.3 Pharmacy layout design.
- 2.4 Legal structure of ownership.
- 2.5 Risk management and insurance.
- 2.6 Purchasing and inventory control.

Unit 3: Communication skills **4 hrs**

- 3.1 Nonverbal communication.
- 3.2 Patterns of behavior in communication.
- 3.3 Questioning and listening skill.
- 3.4 Quarries of communication.
- 3.5 Confidentially.

Unit 4: Good community pharmacy practice **4 hrs**

- 4.1 Requirements of premises/layout.
- 4.2 Requirements of equipment.
- 4.3 Requirements of manpower.
- 4.5 Requirements of material.
- 4.5 Requirements of storage and inventory control.
- 4.6 Requirements of services.
- 4.7 Requirements of documentation.

Unit 5: Ethical aspects of Pharmacy **2 hrs**

- 5.1 Rules of moral conduct in pharmacy
- 5.2 Difference between pharmacy and other profession
- 5.3 Importance of ethics in pharmacy

Part-two: Pharmaceutical Jurisprudence

Unit 1: Pharmaceutical Jurisprudence **18hrs**

- 1.1 Introduction
 - History of pharmaceutical legislation
 - Pharmaceutical industry
 - Pharmaceutical education system of Nepal
 - Vyavahara-Ayurveda,
 - Its scope
 - Importance and use in Ayurvedic health institutions.
- 1.2 Acts and Regulations,
 - Documents of National Health Policy,
 - Nepal Ayurveda Health Policy,
 - Drug Policy and Acts,
 - Treatment protocols & Guidelines.
- 1.3 Health Service Acts and Regulations: different Health Council Acts and Regulations
- 1.4 Documents of National Health Policy, Nepal Ayurveda Health Policy, Drug Policy and Acts, Treatment protocols & Guidelines.
- 1.5 Health Service Acts and Regulations, different Health Council Acts and Regulations
- 1.6 Drugs Act, 2035 /1978
- 1.7 Drug Consultation Council and Drug Advisory Regulation 2037(1980).

- 1.8 Drug Registration Regulation 2038(1981).
- 1.9 Drug Inspection Regulation 2040(1983).
- 1.10 Drug Standard Regulation 2043(1986).
- 1.11 Drug Manufacture Codes 2041(1984).
- 1.12 Drug Sale and Distribution Codes 2071
- 1.13 Good Manufacturing Practices (AusadiUtpadanSangita 2041)
- 1.14 Ayurveda Churna Nirman Sahmita 2075

Unit 2: A brief accounts on the following Policies and Functions 7hrs

- 2.1 Hospital pharmacy guideline with amendment
- 2.2 Nepal Ayurveda Health Policy,
- 2.3 National Health policy
- 2.4 National Drug policy
- 2.5 Consumer Protection Act 2054(1998).
- 2.6 Narcotic drug control act relating to pharmaceutical product and the relation of act with Drugs Act 1978
- 2.7 Control of poisonous and hazardous chemical substances and their control Mechanism
- 2.8 Pharmaceutical Institutions and organizations of Nepal and their function
- 2.9 Drugs banned in Nepal and the reason of drug banning

Part 3: Toxicology

Unit 1: Etymology of Agadatantra: 7 hrs

- 1.1 Definition
- 1.2 Etymology of visa (poison/toxin).
- 1.3 The sources of visa (poison/toxin) and effects of visa (poison).
- 1.4 Types and classification of visa (poison).
- 1.5 The modalities of Sthavara visa (poisons of plant origin) and Jangama visa (Poisons of animal origin).

Unit 2: Investigations of visa: 4 hrs

- 2.1 Characteristics and Pancabhautika investigation.
- 2.2 The animal testing of visa according to source and properties.
- 2.3 The probable diseases.

Unit 4: Upavisa: 7 hrs

- 4.1 Definition of Dusivisa and Gara visa.
- 4.2 Signs and symptoms of poisoning and its treatment.
- 4.3 Description,
- 4.4 Signs and treatment of upa visa.
- 4.5 Kupilu, Bhilava, Afima, Jayapala, Dhatura, Arka, Snuhi, Kalihari, Gunja, Asvamara Bhanga.

Unit 5: Investigation 7 hrs

- 5.1 Investigation of different types of visa of plant origin and artificial toxins like sulphuric acid on the basis of properties and signs & symptoms.

- 5.2 The lethal dose of poison
- 5.3 Lethal time lethalsigns and symptoms and their principle of treatment.

Unit 6: Jangama visa (poisons of animal origin) : 7 hrs

- 6.1 Snake venom, the types of poisonous snakes,
- 6.2 Signs ofsnake biteand treatment.
- 6.3 Scorpion poison,
- 6.4 Luta visa(spider poison)
- 6.5 Musaka visa(rat poison)
- 6.6 Signsand treatment.
- 6.7 The signsand symptoms,
- 6.8 Curability,incurabilityof Alarka visa (Rabies).

Unit 7: Mineral toxins: 7hrs

- 7.1 Parada (mercury),
- 7.2 Naga (lead)
- 7.3 Vanga (tin),
- 7.4 Giripasana (arsenic),
- 7.5 Tamra(copper)
- 7.6 Signs & symptoms of toxicity and treatment.

Unit 8: Descriptionof Ahara visa (food poisoning): 7hrs

- 8.1 Signs & symptoms,
- 8.2 Viruddha (incompatible) food combinations in context of properties, (Guna Viruddha)
- 8.3 Time (Kala Viruddha),
- 8.4 Matra viruddha (quantity), and
- 8.5 Svabhava viruddha (nature/quality)

Practical

Part 1: Social Pharmacy 24 hours

1. Draw a model prescription showing different parts of the prescriptions.
2. Collect the label of different dosages form and comment on the label on the basis of general labeling requirements.
3. Perform role plays in for communication skill.
4. Perform pharmacy design and layout.
5. Handle Prescription.
6. Perform good pharmacy practice audit.
7. Extemporaneous preparation calculation in different dosage forms.

Part 2: Pharmaceutical Jurisprudence 24 hours

1. Organize a Seminar on National Health policy
2. Organize Seminar on National Drug policy
3. Discuss the banded list of drugs with rational and enlist the detail list.

4. Discuss the importance and provision of different “Anusuchies” included in the following regulations: Documents of National Health Policy, Nepal Ayurveda Health Policy, Drug Policy and Acts, Treatment protocols & Guidelines.
5. Read Health Service Acts and Regulations, different Health Council Acts and Regulations
 - a. Drug Registration Regulation 2038(1981).
 - b. Drug Inspection Regulation 2040(1983).
 - c. Drug Standard Regulation 2043(1986).
 - d. Drug Manufacture Codes 2041(1984).
 - e. Drug Sale and Distribution Codes 2041

Part 3: Toxicology

12 hours

1. Demonstrate in toxicology museum
2. Identify poisonous substances

References:

1. Alfonso R. Gennaro: Remington the Science and Practice of Pharmacy, Volume II (20th Edition) 2002, Lippincott Williams & Wilkins, Philadelphia.
2. J. Winfield and R. M. E. Richards: Pharmaceutical Practice (2nd Ed.) 1998, Churchill Livingstone, Edinburg.
3. Kevin Taylor and Geoffrey Harding – Pharmacy Practice. Taylor and Francis, Latest edition.
4. Nepal Ayurveda Health Policy,
5. Regulations and others guidelines of DDA related to community Pharmacy, MOHP, Government of Nepal.
6. Drug Act 2035 and Rules and Regulations under it. Government of Nepal. MOHP.
7. Patent Act and Company Act of Nepal, Government of Nepal, MOIC.
8. Health Related Regulations and Policies, Government of Nepal. MOHP.
9. Consumer Protection Act 2054(1998), Government of Nepal.
10. Nepal Pharmacy Council Act 2057 (2000)
11. National Drug Policy 1995.
12. Agada Tantra Sh. Ramanath Dwivedi
13. Text book of Agada Tantra Edited by Dr Huparikar, Dr.Joglekar
14. Agadatantra ki Pathyapustaka Edited By Dr Huparikar, Dr.Joglekar 8. Agad Tantra Dr. Shekher Namboodri
15. Vishachikitsa Vaidya Balakrishnan Nair, Kerala (Ayurveda Toxicology English Translation)

Roganidana and Chikitsa

Total: 180 hrs (6 hrs/week)

Theory total: 120 (4 hrs/week)

Practical total: 60 hrs (2 hr/week)

Full marks: 100 (Th.75+Pr.25)

Course Description

This course is designed to equip students with the knowledge of classical ayurvedadiseases and general common clinical conditions with their general and first aid management mainly focusing on rogadohikar.

Course Objectives

After completing the course the student will be able to:

- 1 Diagnose general diseases as per their sign and symptoms
- 2 Take vital sign
- 3 Perform first aid management of common condition
- 4 Familiarize with rogadohikarie drug of choice
- 5 Differentiate between emergency or rapidly attention seeking diseases & chronic diseases
- 6 Introduce the important classical diseases described in ayurvedasamhitas
- 7 Dispense medicine of various systemic diseases & conditions
- 8 Coordinate with multidepartment of medicine (surgery, pediatrics, ENT, gynecology, general medicine).

Unit 1: Basic of roganidana

(30 hrs)

- 1.1 Astangaayurveda its importance and correlation with modern clinical department
- 1.2 Roga its synonyms and classification
- 1.3 Rogiparikhya (tribidh, shadbidh & astabidh) including vital sign examination
- 1.4 Panchanidana
- 1.5 Inflammation, its causes and changes during inflammation
- 1.6 General introduction of Infection, infestation, ischemia, infraction, necrosis & gangrene.

Unit 2: Nidana, samanyarupa & drug of choice of following diseases

(30 hrs)

- Pandu (anaemia)
- Kamala (jaundice)
- Mutrakriccha (dysuria)
- Mutraghata (renal failure)
- Prameha (diabetes)
- Mutraahmari (renal calculus)

- Kustha
- Bisharpa
- Jwor
- Aamvata (rhumatoid arthritis)
- Vatarakta (gouty arthritis)
- Chardi (vomitting)
- Aruchi (anorexia)
- Ajirna (indigestion)
- Amlapitta (hyperacidity)
- Atisara (diahorrea)
- Prabahika (desentry)
- Grahani
- Soth(oedema)
- Swash (bronchial asthma)
- Kash (cough)
- Hikka (hiccup)
- Thyroid disorder

Unit 3: Emergency drugs, first-aid management & emergency management of following emergency conditions: (30 hrs)

- Acute abdomen
- Acute chest pain
- Status asthmaticus
- Status eplipticus
- Burn
- Angina pectoris
- Dehydration
- Acute retention of urine
- Poisoning (op, mushroom , kerosene)
- Haemorrhage
- Heat stroke
- Hypothermia
- Fracture and dislocation

Unit 4: Nidana, samanyarupa and drug of choice (rogadhikar) of following multi-systemic diseases: (30 hrs)

- Aantrabridhhi (Hernia)
- Brishan sotha (Hydrocele)
- Arsha (Haemorhoids)
- Bhagandar (Anal fistula)
- Parikartika (Anal fissure)
- Gudabhramsa (Rectal prolapse)

- Pradar (Sweta & rakta)
- Kastartav (Dysmenhorea)
- Bandhatwo (Infertility)
- Mookhpaak (Stomatitis)
- Tundikerisoth (Tonsilitis)
- Pratisyaya (Rhinitis)
- Pinas (Sinusitis)
- Karna paak (ASOM\CSOM)
- Conjunctivitis
- Glaucoma
- Cataract
- Trachoma
- Avasad (Depression & anxiety)

Practical

Unit 1: Vital sign examination (10 hrs)

1.1 Introduction and demonstration of following equipments:

- Thermometer
- Sphygmomanometer
- Stethoscope

1.2 Takevital signs

Unit 2: Rogiparikchhyabidhi (16 hrs)

- Demonstrate tribidh and astabidhrogiparikchhya

Unit 3: First aid (22 hrs)

3.1 Demonstrate life saving measures.

3.2 Clear ABC

3.3 Perform first aid management of following conditions:

- Acute abdomen pain
- Acute chest pain
- Fever
- RTA
- Hemorrhage
- Burn
- Fracture & dislocation
- Snake bite
- Poisoning.

Unit 4: Emergency department \ hospital visit

(12 hrs)

Text Books:

1. Kayachikitsa, Dr. Shivacharan Dhyani, ChaukhambhaBharati Academy, Varanasi, India.
2. Ayurveda Nidan Chikitsa, (Part I, II & III), Prof. Dr. Ramharsha Singh, ChaukhambhaBharati Academy, Varanasi, India.
3. Diagnostic & Treatment Manual for Primary Health Care in the District: K.K. Kafle & Pinniger R.G., Health Learning Material Centre, IOM, TU, Kathmandu.

Reference Texts:

1. Textbook of Medicine, Dr. S.Dhungel & Dr. U.Pathak, HLMC, IOM, TU, Kathmandu.
2. Differential Diagnosis, Dr. U.Pathak, HLMC, IOM, TU, Kathmandu.
3. Hutchinson's Clinical Method, ELBS Publications
4. Communicable diseases, S.Dhungel & U.Pathak, HLMC, IOM, TU, Kathmandu.
5. Medical Problems for Health Post Workers, P.Sayami, HLMC, IOM, TU, Kathmandu.
6. Vishak Karmasiddhi, Dr. Ramanath Dwivedi, ChaukhambhaBharati Academy, Varanasi, India.
7. Davidson's Principles and Practice of Medicine, Churchill Livingstone
8. Relevant portions of Charak-samhita, Sushruta-samhita, Ashtanga-hridaya and Ashtanga-sangraha.

Comprehensive Professional Filed Practice

Nature: Field Practice

Full Marks: 300

Total: 420 hrs (42 hrs per week)

Course Description

This course is designed to gain the technical knowledge and skill of students and applying it in the related professional practice.

Course Objectives

After the completion of this course, the students will be able to:

1. Read and interpret prescription and dose, council the patients and dispense the medicine
2. Assist in the production and quality assurance of pharmaceuticals
3. Promote rational use of medicine within the hospital pharmacies and community pharmacies
4. Demonstrate leadership in managing quality supply of pharmaceuticals
5. Aware the community about the use of locally available medicinal plants

Placement Schedule

Students are deputed in drug manufacturing companies, pharmacy of Ayurveda Hospital and DAHC, health institutions /services, regulatory bodies, labs, herbal garden or forest areas to practice/study/observe the following subjects areas for the periods of 10 weeks (42 hrs per week i.e. $42 \times 10 = 420$ hrs).

S.N.	Subject or Area	Duration
1.	Dravyaguna Vigyan	90 hrs (15 days x 6 hrs)
2.	Rasashastra and Bhaishajya Kalpana	90 hrs (15 days x 6 hrs)
3.	Health Institutions, Drug regularitory bodies	60 hrs (10 days x 6 hrs)
4.	Hospital and community pharmacies	90 hrs (15days x 6 hrs)
5.	Industries/QA-QC and labs	90 hrs (15days x 6 hrs)
	Total	420 hrs (70 days)

Skills and Tasks to be Performed

1. Visit various herbal garden, herbal farms and forest to collect medicinal plants and prepare herbarium (minimum of 100 medicinal plants studied in the course)
2. Identify the locally available medicinal plants and know about its time and methods of collection, drying, processing and storage
3. Aware the people about the use of available local medicinal plants as medicine safely and in proper dose

4. Prepare different types of Ayurvedic medications such as choorna, vati, rasa, bhasma, asava-arishtha, avaleha, taila, malaham, cold infusion, decoction etc
5. Prepare KAP (knowledge, attitude and practice) questionnaire and collect data from patients
6. Visit MoHP, NAMC, NHPC, DoA, DAHC, AA, DDA
7. Observe, identify and report the health related facilities provided by DAHC and AA and elements of primary health care
8. Perform sterilization of surgical instruments, glassware and hospital supplies
9. Observe and assist ADR monitoring
10. Study the manufacturing process of pharmaceutical products and note the technology used
11. Carry out the study on quality control and quality assurance of pharmaceutical products and devices
12. Read, interpret and dispense correctly a prescription and counsel the patient on drugs and therapy related issues
13. Observe and report the proper use of medicine of the visited health institutions
14. Maintain records of institutional activities, supplies, inventories and logistics
15. Perform dispensing and distribution of pharmaceutical products and devices in community pharmacy and hospital settings
16. Prepare comprehensive field report

Evaluation Scheme of Comprehensive Professional Field Practice

S.N.	Related Organization	Full Marks	Remarks
1.	Field Practice Providing Organization	100	
2.	Related Training Institutes	100	
3.	CTEVT or Its Nominees (Final Evaluation)	100	
	Total	300	

Internal Evaluation Scheme for Field Practicum

Attendance:	10%
Participation in PHCC/HP activities:	40%
Participation in community activities:	30%
Report preparation and presentation:	20%
Total:	100%

Experts Involved

1. Dr. Shiva Mangal Prasad Shah, Ayurveda campus Kirtipur
2. Dr. Kashiraj Subedi, Ayurveda campus Kirtipur
3. Dr. Narendranath Tiwari, Ayurveda campus Kirtipur
4. Dr. Chardraraj Sapkota, Ayurveda campus Kirtipur
5. Dr Bamsadeep Kharel, Baidhyakhana bikash samiti
6. Dr. Vashudev Upadhyaya, Department of Ayurveda, Teku
7. Dr. Narayan Shrestha, Ayurveda Medical Council
8. Dr. Munkarna Thapa, Department of Ayurveda, Teku
9. Dr. Prakash Gyawali, Department of Drug Administration
10. Dr. Raman Bhattarai, Dhanwantari Ayurveda Institute
11. Dr. Sanjit Sapkota Dhanwantari Ayurveda Institute
12. Dr. Yugaraj Sapkota Ayurveda campus Kirtipur
13. Dr. Prashant Kumar Singh, Patanjali Ayurveda Campus
14. Dr Kapil Amgain Patanjali Ayurveda Campus
15. Dr Muktaraj Lamichhane Dhanwantari Ayurveda Institute
16. Dr. Amrit Bhandari Himalayan Ayurveda collage
17. Mr. Manoj K C, Ayurveda pharmacist