महाराष्ट्र राज्य तंत्र शिक्षण मंडळ.

(स्वायत्त) (ISO: ९००१:२०१५) (ISO/IES: २७००१-२०१३)

शासकीय तंत्रनिकेतन इमारत, चौथा मजला, ४९, खेरवाडी, बांद्रा (पूर्व), मुंबई - ४०० ०५१.

दूरध्वनी क्र.: ०२२-६२५४२१००/ १५१ / १५२

Email : director@msbte.com Web : www.msbte.org.in

जा.क्र.मरातंशिमं/का-५०/अभ्यासक्रम/२०२१/ ६४२५ दिनांक: 30 SEP 2021

महत्वाचे परिपत्रक

प्रति,
प्राचार्य,
औषधनिर्माणशास्त्र पदविका अभ्यासक्रम राबविणा-या
मंडळाशी सलंग्नीत सर्व संस्था.

विषय :- **औषधनिर्माणशास्त्र या पदविका अभ्यासक्रमाच्या नवीन सुधारीत पाठयक्रमाबाबत...**

संदर्भ :- १. भारतीय राजपत्र क्र. सी.जी.-डी.एल.-अ.-१७१०२०२०-२२२५३४ dated १६.१०.२०२०

२. Pharmacy Council of India यांचे दि. २३.०९.२०२१ रोजीचे पत्र क्र. 14-55-2021- PCI(A)/3642-45

उपरोक्त संदर्भ क्र. १ अन्वये Education Regulations, २०२० for Diploma Courses in Pharmacy प्रसिद्ध करण्यात आले होते. तद्नंतर Education Regulations, २०२० नुसार नवीन पाठयक्रमाची अंमलबजावणी शैक्षणिक वर्ष २०२१-२२ पासून करण्याकरिता Pharmacy Council of India, New Delhi यांनी संदर्भ क्र. २ नुसार निर्देशित केले आहे.

त्यानुसार Diploma in Pharmacy करिता सुधारित पाठ्यक्रम Pharmacy Council of India, New Delhi च्या Education Regulations, २०२० प्रमाणे शैक्षणिक वर्ष २०२१-२२ पासून प्रथम वर्षाकरिताचा लागू करण्यात येत आहे. तद्नंतर व्दितीय वर्षाकरिता नवीन पाठ्यक्रम शैक्षणिक वर्ष २०२२-२३ पासून लागू करण्यात येईल. सदर नवीन अभ्यासक्रमाच्या पाठ्यक्रमाची अंमलबजावणी संस्था स्तरावर करण्यात यावी. नवीन पाठयक्रमातील विषयांना Subject Code व Abbreviation तसेच Examination Scheme बाबतची आवश्यक माहिती मंडळामार्फत देण्यात येईल.

संस्थेच्या प्राचार्यांनी संबंधीत अध्यापकांना आवश्यक ते मार्गदर्शन व प्रशिक्षण देऊन Education Regulations, २०२० नुसार पाठयक्रमाची अंमलबजावणी करण्याबाबत सर्व कार्यवाही करावी.

(डॉ. विनोद म. मोहितकर)
संचालक
महाराष्ट्र राज्य तंत्र शिक्षण मंडळ, मुंबई

सोबत :- संदर्भांकित दोन्ही पत्र.

प्रत :-

१. उपसचिव, निकाल विभाग, महाराष्ट्र राज्य तंत्र शिक्षण मंडळ, मुंबई.
२. उपसचिव, परीक्षा विभाग, महाराष्ट्र राज्य शिक्षण मंडळ, मुंबई.
३. उपसचिव, महाराष्ट्र राज्य तंत्र शिक्षण मंडळ, विभागीय कार्यालय, मुंबई, पुणे, औरंगाबाद व नागपूर यांना माहितीसाठी.

रजिस्ट्री सं. डी.एल.- 33004/99 REGD. No. D. L.-33004/99

भारत का राजपत्र
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भारतीय भेषजी परिषद

अधिसूचना

नई दिल्ली, 9 अक्टूबर, 2020

फार्मेसी (भेषजी) में डिप्लोमा कोर्स के लिए शिक्षा विनियम, २०२०

भेषजी अधिनियम, १९४८ की धारा १० के तहत विनियम।

(भारत सरकार एवं स्वास्थ्य एवं परिवार कल्याण मंत्रालय के पत्रांक **जेड**-28020/59/2019-**ए एच एस/एफ टी एस**-8012809 **दिनांक** 7.10.2020) द्वारा अनुमोदित एवं भारतीय भेषजी परिषद् द्वारा प्रकाशित)

सं. १४-५५/२०२०- भा.भे.परि. - भेषजी अधिनियम, १९४८ (१९४८ का ८) की धारा १० द्वारा प्रदत्त शक्तियों का प्रयोग करते हुए भारतीय भेषजी परिषद केन्द्रीय सरकार के अनुमोदन से निम्नलिखित संशोधन करती है, अर्थातः-

अध्याय - १

१. संक्षिप्त शीर्षक और प्रारंभः-

(१) इन विनियमों को फार्मेसी (भेषजी) में डिप्लोमा कोर्स के लिए शिक्षा विनियम, २०२० के नाम से जाना जाएगा।

(२) ये राजपत्र में प्रकाशन की तारीख से प्रवृत्त होंगे।

२. फार्मासिस्ट के लिए योग्यताः-

फार्मेसी में डिप्लोमा (भाग-I और भाग-II) में उत्तीर्ण और फार्मेसी में डिप्लोमा (भाग-III) का संतोषजनक समापन फार्मासिस्ट के रूप में पंजीकरण के लिए आवश्यक न्यूनतम योग्यता है।

अथवा

भारतीय भेषजी परिषद द्वारा अनुमोदित उपरोक्त परीक्षा के समकक्ष कोई अन्य योग्यता।

३. फार्मेसी में डिप्लोमा (भाग-I, भाग-II और भाग-III) में अध्ययन पाठ्यक्रम को पूरा करने का एक प्रमाण पत्र शामिल होगा और अध्याय-२ और अध्याय-३ में निर्धारित इन नियमों के अनुसार प्रैक्टिकल ट्रेनिंग (व्यवहारिक प्रशिक्षण) को संतोषजनक तरीके से पूरा कर लिये जाने पर परीक्षा उत्तीर्ण की जाएगी।

अध्याय - २

४. **फार्मेसी में डिप्लोमा (भाग-I तथा भाग-II):-**

फार्मेसी में डिप्लोमा में प्रवेश के लिए न्यूनतम योग्यता - भौतिकी, रसायन विज्ञान और जीव विज्ञान या गणित के साथ १०+२ परीक्षा (विज्ञान शैक्षणिक स्ट्रीम) में उत्तीर्ण।

अथवा

भारतीय भेषजी परिषद द्वारा अनुमोदित उपरोक्त परीक्षा के समकक्ष कोई अन्य योग्यता।

बशर्ते कि अनुसूचित जाति और अनुसूचित जनजाति के अभ्यर्थियों के लिए केंद्र सरकार/राज्य सरकारों/ केंद्र शासित प्रदेश प्रशासनों द्वारा जारी निर्देशों के अनुसार सीटों का आरक्षण हो, समय-समय पर जैसा भी मामला हो।

५. **पाठ्यक्रम की अवधि:-**

(१) पाठ्यक्रम की अवधि दो शैक्षणिक वर्षों की होगी। प्रत्येक शैक्षणिक वर्ष एक सौ अस्सी कार्य दिवसों से कम की अवधि का नहीं होगा।

(२) इसके अतिरिक्त, पाँच सौ घंटे की प्रैक्टिकल ट्रेनिंग (व्यावहारिक प्रशिक्षण) तीन महीने से कम अवधि की नहीं होगी।

६. **अध्ययन पाठ्यक्रम :-**

फार्मेसी में डिप्लोमा भाग-I और फार्मेसी में डिप्लोमा भाग-II के अध्ययन पाठ्यक्रम में नीचे तालिका I और II में दिये गये विषय शामिल होंगे। थ्योरी और प्रैक्टिकल में इसे पढ़ाने हेतु प्रत्येक विषय के लिए उतने ही घंटों का समय दिया जायेगा जो नीचे दी गयी तालिकाओं के कॉलम २ और ३ में इसके सामने दिया गया है। हालाँकि, भारतीय भेषजी परिषद द्वारा पाठ्यक्रम और प्रैक्टिकल ट्रेनिंग में समय-समय पर परिवर्तन किया जा सकता है।

तालिका - I

फार्मेसी में डिप्लोमा (भाग I)

	घंटों की संख्या		
विषय	**थ्योरी**	**प्रैक्टिकल**	**शिक्षण**
फार्मास्यूटिक्स	७५	७५	२५
फार्मास्युटिकल रसायन शास्त्र	७५	७५	२५
फार्माकोग्नॉसी (भेषज-अभिज्ञान)	७५	७५	२५
मानव शरीर रचना विज्ञान और शरीर क्रिया विज्ञान	७५	७५	२५
सामाजिक फार्मेसी	७५	७५	२५
कुल	**३७५**	**३७५**	**१२५**

तालिका - II

फार्मेसी में डिप्लोमा (भाग II)

	घंटों की संख्या		
विषय	**थ्योरी**	**प्रैक्टिकल**	**शिक्षण**
फार्माकोलॉजी	७५	५०	२५
सामुदायिक फार्मेसी और प्रबंधन	७५	७५	२५
जीवरसायन एवं नैदानिक रोग विज्ञान	७५	५०	२५
फार्माकोथैरेप्यूटिक्स	७५	२५	२५
अस्पताल और नैदानिक फार्मेसी	७५	२५	२५
फार्मेसी कानून और नैतिकता	७५	-	२५
कुल	**४५०**	**२२५**	**१५०**

तालिका III

फार्मेसी में डिप्लोमा (भाग III)

प्रैक्टिकल ट्रेनिंग- ५०० घंटे

गतिविधियाँ

१) ड्रग्स और मेडिकल उपकरणों का संग्रहण (स्टॉक)

२) सूची नियंत्रण प्रक्रियाएं

३) पर्चे का रखरखाव

४) वितरण (२५० घंटे)

५) रोगी परामर्श

७. **पाठ्यविवरणः-**

भारतीय भेषजी परिषद द्वारा अध्ययन के प्रत्येक विषय के लिए पाठ्यविवरण समय-समय पर निर्धारित किया जाएगा।

८. **अध्ययन पाठ्यक्रम का चलाने वाले को प्राधिकारी की स्वीकृतिः-**

(१) किसी राज्य में कोई भी प्राधिकारी भारतीय भेषजी परिषद की पूर्व स्वीकृति के बिना फार्मेसी में डिप्लोमा अध्ययन पाठ्यक्रम शुरू या उसका संचालन नहीं करेगा।

(२) विनियमन ६ में उद्धृत नियमित शैक्षणिक अध्ययन पाठ्यक्रम ऐसे संस्थान में चलाया जायेगा, जिसे भेषजी अधिनियम, १९४८ की धारा १२ की उपधारा (१) के तहत भारतीय भेषजी परिषद द्वारा मान्यता प्राप्त है।

विदित हो कि भारतीय भेषजी परिषद इस विनियमन के तहत किसी भी ऐसे संस्थान को तब तक मान्यता नहीं देगा, जब तक कि संबंधित संस्थान द्वारा भवन, आवास, उपकरण व अध्यापकगण आदि की दृष्टि से शिक्षण हेतु पर्याप्त व्यवस्था प्रदान नहीं कर दी जाती, जैसा कि इन विनियमनों के परिशिष्ट-क में दिया गया है। भारतीय भेषजी परिषद द्वारा इन विनियमनों में समय-समय पर परिवर्तन किया जा सकता है।

९. **परीक्षाएं:-**

(१) वार्षिक परीक्षा शैक्षणिक वर्ष के अंत में होगी।

(२) परीक्षा प्राधिकारी द्वारा निर्दिष्ट मानदंडों के अनुसार जैसा भी मामला हो, जो छात्र फार्मेसी में डिप्लोमा भाग-I या भाग-II उत्तीर्ण करने में सक्षम नहीं है यदि आवश्यक हो, तो उनके लिए एक पूरक (सप्लीमेंटरी) परीक्षा होगी ।

(३) परीक्षाएँ लिखित और प्रैक्टिकल (मौखिक सहित) होंगी, विषय के प्रत्येक खंड के लिए निर्धारित अधिकतम अंक नीचे दी गयी तालिका IV और V में दिया गया है।

तालिका – IV

फार्मेसी में डिप्लोमा (भाग-I) परीक्षा

	ध्योरी के लिए अधिकतम अंक			प्रैक्टिकल के लिए अधिकतम अंक		
विषय	परीक्षा	*सत्रात्मक	कुल	परीक्षा	*सत्रात्मक	कुल
फार्मास्यूटिक्स	८०	२०	१००	८०	२०	१००
फार्मास्युटिकल रसायन शास्त्र	८०	२०	१००	८०	२०	१००
फार्माकोग्नॉसी (भेषज-अभिज्ञान)	८०	२०	१००	८०	२०	१००
मानव शरीर रचना विज्ञान और शरीर क्रिया विज्ञान	८०	२०	१००	८०	२०	१००
सामाजिक फार्मेसी	८०	२०	१००	८०	२०	१००
			५००	+ ५००	=	१०००

* आंतरिक मूल्यांकन

तालिका – V

फार्मेसी में डिप्लोमा (भाग -I)

परीक्षा

	ध्योरी के लिए अधिकतम अंक			प्रैक्टिकल के लिए अधिकतम अंक		
विषय	परीक्षा	*सत्रात्मक	कुल	परीक्षा	*सत्रात्मक	कुल
फार्माकोलॉजी	८०	२०	१००	८०	२०	१००
सामुदायिक फार्मेसी और प्रबंधन	८०	२०	१००	८०	२०	१००
जीवरसायन एवं नैदानिक रोग विज्ञान	८०	२०	१००	८०	२०	१००
फार्माकोथैरेप्यूटिक्स	८०	२०	१००	८०	२०	१००
अस्पताल और नैदानिक फार्मेसी	८०	२०	१००	८०	२०	१००
फार्मेसी कानून और नैतिकता	८०	२०	१००	-	-	-
			६००	+४००	+१००	= ११००

* आंतरिक मूल्यांकन

१०. फार्मेसी में डिप्लोमा भाग-I और भाग-II परीक्षा में प्रवेश की पात्रता:-

केवल ऐसे अभ्यर्थी ही फार्मेसी में डिप्लोमा (भाग-I) या (भाग-II) की परीक्षा में शामिल हो सकेंगे, जो उस शैक्षणिक संस्थान, जहाँ से उन्होंने फार्मेसी में डिप्लोमा भाग-I या भाग-II अध्ययन पाठ्यक्रम पूरा किया है, के प्रमुख द्वारा जारी किया गया प्रमाण-पत्र प्रस्तुत कर इस आशय की पुष्टि करें कि उन्होंने प्रत्येक विषय में थ्योरी और प्रैक्टिकल में अलग-अलग चलने वाली कक्षाओं में ७५ प्रतिशत से अधिक उपस्थिति बनाये रखते हुए नियमित एवं संतोषजनक फार्मेसी में डिप्लोमा (भाग-I) या (भाग-II) तरीके से पाठ्यक्रम पूरा किया है।

११. परीक्षाओं का प्रकार:-

(१) तालिका - IV और V में उल्लिखित विषयों की थ्योरी और प्रैक्टिकल परीक्षा तीन घंटे की अवधि की होगी। थ्योरी और प्रैक्टिकल दोनों को दो अलग-अलग पेपर के रूप में माना जाता है।

(२) किसी विषय के थ्योरी या प्रैक्टिकल की परीक्षा में अनुत्तीर्ण अभ्यर्थी को अनुत्तीर्ण विषय की परीक्षा दोबारा देनी होगी। उत्तीर्णता मानदंड के लिए विषय विशेष के थ्योरी और प्रैक्टिकल को अलग-अलग विषय माना जाता है।

(३) प्रैक्टिकल परीक्षा में एक मौखिक-परीक्षा भी शामिल होगी।

१२. सत्रात्मक अंक देना एवं रिकॉर्ड का रखरखाव:-

(१) फार्मेसी भाग-I में डिप्लोमा के लिए प्रशिक्षण प्रदान करने वाले संस्थान में और फार्मेसी भाग-II पाठ्यक्रमों में डिप्लोमा प्रदान करने वाले संस्थान में थ्योरी और प्रैक्टिकल दोनों प्रकार के कक्षा कार्य (क्लास वर्क) और परीक्षाओं का एक नियमित रिकॉर्ड, संस्थान में प्रत्येक छात्र के लिए बनाए रखा जाएगा और प्रत्येक थ्योरी के लिए २० अंक और प्रत्येक प्रैक्टिकल विषय के लिए २० अंक सत्रात्मक अंकों के रूप में दिये जायेंगे।

(२) प्रत्येक शैक्षणिक वर्ष के दौरान दो या अधिक आवधिक सत्रात्मक (आंतरिक मूल्यांकन) परीक्षाएं होंगी। किसी भी दो प्रदर्शन (परफॉर्मेंस) के सर्वाधिक कुल योग के आधार पर सत्रात्मक अंकों की गणना होगी।

(३) प्रैक्टिकल परीक्षा में सत्रात्मक (सेशनल) अंक निम्नलिखित आधार पर दिए जाएंगे:

(i) सत्रात्मक/अंतर परीक्षा में वास्तविक प्रदर्शन = १० अंक

(ii) व्यावहारिक कक्षा/अंतर कार्य में दिन-प्रतिदिन मूल्यांकन = १० अंक

१३. परीक्षा उत्तीर्ण करने के लिए न्यूनतम अंक

जब तक कि छात्र थ्योरी और प्रैक्टिकल परीक्षाओं के अलग-अलग प्रत्येक विषय में सत्रात्मक अंकों सहित कम-से-कम ४० प्रतिशत अंक प्राप्त नहीं करता, तब तक उस छात्र को फार्मेसी में डिप्लोमा की परीक्षा में उत्तीर्ण घोषित नहीं किया जायेगा। सभी विषयों को मिलाकर ६० प्रतिशत या इससे अधिक अंक पाने वाले अभ्यर्थियों को प्रथम श्रेणी से उत्तीर्ण घोषित किया जायेगा। किसी भी विषय या विषयों में ७५ प्रतिशत या इससे अधिक अंक अर्जित करने वाले छात्र को उस विषय या उन विषयों में विशेष सम्मान अंकों (डिस्टिंक्शन मार्क्स) से उत्तीर्ण घोषित किया जायेगा। प्रथम श्रेणी और विशेष सम्मान अंक (डिस्टिंक्शन मार्क्स) इस शर्त के आधीन होगा कि छात्र एक ही प्रयास में सभी विषयों को पास करेगा।

१४. फार्मेसी में डिप्लोमा (भाग-II) में कक्षोन्नति की पात्रता:-

वो सभी अभ्यर्थी जो सभी विषयों में उपस्थित हुए हैं और फार्मेसी में डिप्लोमा भाग-I परीक्षा में उत्तीर्ण हुए हैं, वे फार्मेसी में डिप्लोमा भाग-II वर्ग में कक्षोन्नति के पात्र हैं। हालाँकि, दो से अधिक विषयों में अनुत्तीर्ण होने पर वो फार्मेसी में डिप्लोमा भाग-II वर्ग में कक्षोन्नत नहीं होंगे।

१५. सत्रात्मक अंकों में सुधार:-

अच्छे सत्रात्मक अंकों के इच्छुक अभ्यर्थी अगले शैक्षणिक वर्ष के दौरान दो अतिरिक्त सत्रीय परीक्षाओं में उपस्थित होकर अच्छा अंक पा सकते हैं। दोनों परीक्षाओं के औसत अंक के आधार पर थ्योरी और प्रैक्टिकल में अच्छे सत्रात्मक अंक हासिल किया जा सकता है। प्रैक्टिकल कक्षा में दिन-प्रतिदिन के मूल्यांकन के आधार पर अभ्यर्थी को दिये गये अंक को बढ़ाने के लिए अभ्यर्थी को फिर से नियमित अध्ययन पाठ्यक्रम में उपस्थित होना होगा।

१६. परीक्षाओं की मंजूरी:-

विनियमन ६ से लेकर १५ तक में बतायी गयी परीक्षाएं किसी राज्य में ऐसे प्राधिकारी (यहाँ से आगे इन्हें परीक्षा प्राधिकारी कहा जायेगा) द्वारा ली जायेंगी, जिन्हें भेषजी अधिनियम, १९४८ की धारा १२ की उप-धारा (२) के तहत भारतीय भेषजी परिषद द्वारा मान्यता प्रदान की जायेगी। इन विनियमनों के परिशिष्ट-ख में दी गयी शर्तों को परीक्षा प्राधिकारी द्वारा पूरा किये जाने की स्थिति में ही, इस तरह की मान्यता को स्वीकृति मिल पायेगी।

१७. फार्मेसी में डिप्लोमा (भाग-II) के लिए परीक्षा उत्तीर्ण करने का प्रमाण पत्र

फार्मेसी में डिप्लोमा भाग-II के लिए परीक्षा उत्तीर्ण करने का प्रमाण पत्र सफल छात्र को परीक्षा प्राधिकारी द्वारा दिया जाएगा।

अध्याय - ३

फार्मेसी में डिप्लोमा (भाग - III)

(प्रैक्टिकल ट्रेनिंग)

१८. प्रैक्टिकल ट्रेनिंग के लिए अवधि और अन्य शर्तें:-

(१) मान्यता-प्राप्त परीक्षा प्राधिकारी द्वारा फार्मेसी में डिप्लोमा के भाग-II की ली गयी परीक्षा में उपस्थित होने के बाद, अभ्यर्थी निम्नलिखित संस्थानों में से एक या एक से अधिक संस्थान में प्रैक्टिकल ट्रेनिंग हासिल करने के लिए पात्र होंगे:

(i) केंद्र/राज्य सरकार द्वारा संचालित अस्पताल/डिस्पेंसरियाँ।

(ii) औषधि एवं प्रसाधन नियम, १९४५ के तहत दवाओं की खुदरा बिक्री के लिए लाइसेंस-प्राप्त फार्मेसी, जहाँ पंजीकृत फार्मासिस्ट्स की सेवाएँ मौजूद हों।

(iii) ऊपर वर्णित उपनियम (i) में दिये गये अस्पताल और डिस्पेंसरी को छोड़कर अन्य अस्पताल और डिस्पेंसरी द्वारा प्रैक्टिकल ट्रेनिंग देने के लिए उन्हें इन विनियमनों के परिशिष्ट-ग में दी गयी शर्तों को पूरा कर पाने की स्थिति में ही भारतीय भेषजी परिषद द्वारा मान्यता प्रदान की जायेगी।

(२) उपनियम (१) में दिये गये संस्थान प्रशिक्षण देने के लिए पात्र होंगे, बशर्ते औषधि एवं प्रसाधन अधिनियम, १९४० और औषधि एवं प्रसाधन नियम, १९४५ के तहत लाइसेंस प्राप्त किसी भी अस्पताल, डिस्पेंसरी या फार्मेसी में छात्र फार्मासिस्ट्स की संख्या ४ से अधिक न हो, जहाँ एक पंजीकृत फार्मासिस्ट उस कार्य में शामिल होगा जिसमें छात्र फार्मासिस्ट को प्रैक्टिकल ट्रेनिंग दी जा रही है, और जहाँ एक से अधिक पंजीकृत फार्मासिस्ट इसी तरह काम में लगे हैं, वहाँ ऐसे प्रत्येक अतिरिक्त एवं पंजीकृत फार्मासिस्ट के लिए यह संख्या २ से अधिक नहीं होगी।

(३) प्रैक्टिकल ट्रेनिंग (व्यावहारिक प्रशिक्षण) के दौरान, प्रशिक्षु को जानकारी होनी चाहिए:-

(i) फार्मेसी के पेशे से संबंधित विभिन्न विधान अधिनियमों द्वारा आवश्यक रिकॉर्ड रखने के कार्य की जानकारी; तथा

(ii) इन विनियमों के विनियमन ६ के अंतर्गत तालिका III में उल्लिखित गतिविधियों में व्यावहारिक अनुभव।

(४) प्रैक्टिकल ट्रेनिंग तीन महीने से अधिक की अवधि में पाँच सौ घंटे से कम की नहीं होगी, जिसमें से दो सौ पचास घंटे का समय नुस्खों के लिए वास्तविक रूप में दवाएँ तैयार करने में देना होगा।

१९. **ट्रेनिंग शुरू होने से पहले पालन की जाने वाली पद्धति:-**

(१) प्रायोगिक प्रशिक्षण प्रदान करने वाले संस्थान के प्रमुख, आवेदन के आधार पर कथित प्रैक्टिकल ट्रेनिंग में शामिल होने के लिए पात्र अभ्यर्थी को ट्रिप्लिकेट 'प्रैक्टिकल ट्रेनिंग कॉन्ट्रैक्ट फॉर्म फॉर फार्मासिस्ट' (जिसे यहाँ से आगे कॉन्ट्रैक्ट फॉर्म (अनुबंध प्रपत्र) कहा जायेगा) देंगे। कॉन्ट्रैक्ट फॉर्म (अनुबंध प्रपत्र) इन नियमों में परिशिष्ट-घ में निर्दिष्ट होगा।

(२) कॉन्ट्रैक्ट फॉर्म का खंड I प्रायोगिक प्रशिक्षण प्रदान करने वाले संस्थान के प्रमुख द्वारा भरा जायेगा। कथित कॉन्ट्रैक्ट फॉर्म का खंड II प्रशिक्षु द्वारा भरा जायेगा और प्रशिक्षण देने के लिए सहमत संस्थान के प्रमुख (जिन्हें यहाँ से आगे अप्रेंटिस मास्टर कहा जायेगा) कथित कॉन्ट्रैक्ट फॉर्म का खंड III भरेंगे।

(३) भरे गये फॉर्म की एक प्रति (जिसे यहाँ से आगे कॉन्ट्रैक्ट फॉर्म की पहली प्रति कहा जायेगा) प्रायोगिक प्रशिक्षण प्रदान करने वाले संस्थान के प्रमुख के यहाँ जमा करने की जिम्मेदारी प्रशिक्षु की होगी और अन्य दो प्रतियाँ (जिन्हें यहाँ से आगे दूसरी और तीसरी प्रति कहा जायेगा) अप्रेंटिस मास्टर (यदि वह चाहे तो) या प्रशिक्षु द्वारा प्रशिक्षण पूरा होने तक भरी जायेंगी।

२०. **फार्मेसी में डिप्लोमा भाग -III उत्तीर्ण करने का प्रमाण पत्र:-**

प्रैक्टिकल ट्रेनिंग अवधि को संतोषजनक तरीके से पूरा कर लिए जाने पर, अप्रेंटिस मास्टर द्वारा कॉन्ट्रैक्ट फॉर्म की दूसरी व तीसरी प्रति का खंड IV भरा जायेगा और उसे प्रायोगिक प्रशिक्षण प्रदान करने वाले संस्थान के प्रमुख यहाँ अग्रेषित कर दिया जायेगा, जो दूसरी व तीसरी प्रति की एंट्रीज को पहली प्रति में उपयुक्त रूप में प्रविष्ट करेंगे और कॉन्ट्रैक्ट फॉर्म की तीनों प्रतियों का खंड V भरेंगे और उसके बाद, दूसरी और तीसरी दोनों ही प्रति प्रशिक्षु को सौंप देंगे।

यह अनुबंध प्रपत्र, सभी प्रकार से पूरा किया गया, जिसे फार्मेसी में डिप्लोमा (भाग-III) के पाठ्यक्रम को सफलतापूर्वक पूरा करने का प्रमाण पत्र माना जाएगा।

अध्याय - ४

२१. फार्मेसी में डिप्लोमा का प्रमाणपत्रः-

फार्मेसी में डिप्लोमा भाग I और भाग II की उत्तीर्णता प्रस्तुत किये जाने और फार्मेसी में डिप्लोमा (भाग-III) की प्रैक्टिकल ट्रेनिंग संतोषजनक तरीके से पूरा कर लिये जाने पर, सफल अभ्यर्थी को परीक्षा प्राधिकारी द्वारा फार्मेसी में डिप्लोमा का प्रमाणपत्र (सर्टीफिकेट) जारी किये जाने की मंजूरी दी जायेगी।

२२. निरसन एवं बचतः-

(१) भारतीय भेषजी परिषद द्वारा प्रकाशित शिक्षा विनियमन, १९९१ (यहाँ के बाद कथित विनियमन कहा गया है), देखें संख्या १४-५५/८७ (पार्ट)-पीसीआई/२४८४-२८८७, तिथि ११.७.१९९२, और उसमें सभी संशोधन एतद् द्वारा निरस्त किये जाते हैं।

(२) इस तरह के निरसन के बावजूद,

(क) कथित विनियमन के तहत की गयी किसी चीज या किसी कार्य को इन विनियमनों के संबंधित प्रावधान के तहत किया गया माना जायेगा।

(ख) एक व्यक्ति जिसे फार्मेसी में डिप्लोमा के लिए प्रशिक्षण के दौरान उक्त विनियमों के तहत छात्र के रूप में भर्ती कराया गया था और जिसने इन विनियमों के प्रारंभ में परीक्षा उत्तीर्ण नहीं की थी, को उक्त विनियमों के प्रावधानों के अनुसार परीक्षा उत्तीर्ण करनी होगी, मानो ये नियम लागू ही नहीं हुए थेः

हालाँकि दिया गया है, विशेष राज्य में परीक्षा प्राधिकारी एक तारीख तय कर सकता है जिसके बाद कथित विनियमन के तहत परीक्षा आयोजित नहीं की जाएगी।

परिशिष्ट-क
(देखें विनियमन ८)

शैक्षणिक संस्थान द्वारा पूरी की जाने वाली शर्तें

फार्मासिस्ट हेतु अध्ययन के पाठ्यक्रमों के अनुमोदन के लिए भारतीय भेषजी परिषद को आवेदन करने वाले किसी भी प्राधिकरण को भेषजी अधिनियम, १९४८ की धारा १२ की उपधारा (१) के अधीन निम्नलिखित प्रदान करना होगा।

(क) आवास

विभाग के प्रधानाचार्य/प्रमुख के कक्ष, कार्यालय, कक्षा, पुस्तकालय, कर्मचारी, कर्मचारियों के सार्वजनिक कक्ष, छात्रों के सार्वजनिक कक्ष, संग्रहालय, स्टोर आदि के लिए पर्याप्त हवादार प्रकाश व्यवस्था और अन्य स्वच्छता वाले उपयुक्त और पर्याप्त आवास प्रदान किये जाने चाहिए।

नीचे दी गई कम से कम चार प्रयोगशालाओं को प्रदान किया जाना चाहिएः -

१. फार्मास्यूटिक्स प्रयोगशाला

२. फार्मा रसायन शास्त्र प्रयोगशाला

३. फिजियोलॉजी (शरीर क्रिया विज्ञान), फार्माकोलॉजी एवं फार्माकोग्नॉसी (भेषज-अभिज्ञान) प्रयोगशाला

४. जीवरसायन, नैदानिक रोग विज्ञान, अस्पताल और नैदानिक फार्मेसी प्रयोगशाला

प्रयोगशालाओं के अतिरिक्त, बैलेंस रूम, एसेप्टिक रूम अथवा कैबिनेट, एक मशीन रूम भी प्रदान किए जाने चाहिए।

न्यूनतम ५०० वर्ग फीट की शर्त के अधीन प्रयोगशाला का फर्श क्षेत्र किसी भी समय प्रयोगशाला में काम करने के लिए आवश्यक प्रति छात्र ३० वर्ग फीट से कम नहीं होना चाहिए।

प्रयोगशालाओं को इस तरह से उपयुक्त और निर्मित किया जाना चाहिए कि इन्हें यथोचित रूप से स्वच्छ रखा जा सके। जहाँ भी आवश्यक हो गैस और पानी की फिटिंग, अलमारियाँ, धुआँ अलमारी प्रदान की जानी चाहिए।

संस्थान निम्नलिखित विवरण के अनुसार 'मॉडल फार्मेसी' प्रदान करेंगे -

मॉडल फार्मेसी	संख्या	क्षेत्र
आवश्यकः चालू मॉडल सामुदायिक फार्मेसी वांछितः ड्रग मॉडल स्टोर	०१	८० वर्ग मीटर (औषधि सूचना केंद्र के लिए १० वर्ग मीटर और रोगी परामर्श के लिए १० वर्ग मीटर।)

"पाठ्यक्रम में जहाँ कहीं भी पशु पर प्रयोग करने की बात कही गयी है, अपेक्षित ज्ञान तथा कौशल कम्प्यूटर आधारित मापक के जरिए प्रदान किया जाये। पशुओं के रखने का स्थान पशुओं पर प्रयोग पर नियन्त्रण तथा देखरेख करने के उद्देश्य से गठित समिति (सी पी सी एस ई ए) के दिशानिर्देशों के अनुसार होना चाहिए।

(ख) कर्मचारी

प्रधानाचार्य/निदेशक/आचार्य/संस्थान के प्रमुख/विभागाध्यक्ष सप्ताह में आठ घंटे तक अध्यापन में लगे रह सकते हैं, और अन्य शिक्षण कर्मचारियों का कार्य भार सोलह घंटे प्रति सप्ताह से अधिक नहीं होना चाहिए।

कर्मचारी-छात्र अनुपात, थ्योरी कक्षाओं में १:६० और प्रैक्टिकल कक्षाओं में १:२० से अधिक नहीं होना चाहिए। प्रैक्टिकल में ३० छात्रों के एक बैच के लिए दो शिक्षक होने चाहिए। उपरोक्त मानदंडों के अनुसार, ६० छात्रों के लिए निम्नलिखित कर्मचारियों की आवश्यकता है:

१. प्रधानाचार्य/निदेशक/आचार्य/संस्थान के प्रमुख/विभागाध्यक्ष - एक

२. व्याख्याता:

- एम.फार्मा/फार्मा. डी - तीन
- ३ वर्ष के पेशेवर अनुभव के साथ बी. फार्मा - चार

नियमित संकाय के अलावा, संस्थान में एनाटॉमी और फिजियोलॉजी और बायोकैमिस्ट्री और क्लिनिकल पैथोलोजी पढ़ाने के लिए विजिटिंग फैकल्टी के रूप में बैचलर ऑफ मेडिसन और बैचलर ऑफ सर्जरी (एम.बी.बी.एस.) संकाय हो सकता है।

प्रधानाचार्य/निदेशक/आचार्य/संस्थान के प्रमुख/विभागाध्यक्ष सहित शिक्षण संकाय की न्यूनतम योग्यता एवं अनुभव और उनके वेतनमान को भेषजी संस्थानों में शिक्षकों की न्यूनतम योग्यता विनियम, २०१४ में निर्धारित किया जाएगा।

शिक्षण कर्मचारियों का वेतनमान समान श्रेणी के पदों के लिए राज्य सरकार/विश्वविद्यालय अनुदान आयोग /अखिल भारतीय तकनीकी शिक्षा परिषद् द्वारा निर्धारित वेतनमान से कम नहीं होगा।

बशर्ते कि उपर्युक्त योग्यता निरस्त शिक्षा विनियमों के तहत नियुक्त पदाधिकारियों पर लागू नहीं होगी।

गैर-शिक्षण कर्मचारी

डी. फार्मा पाठ्यक्रम के लिए गैर-शिक्षण कर्मचारियों की सूची:

१.	प्रयोगशाला तकनीशियन (योग्यता- फार्मेसी में डिप्लोमा)		२
२.	प्रयोगशाला परिचर		४
३.	कार्यालय अधीक्षक		१
४.	लिपिक-सह-लेखाकार		१
५.	स्टोर-कीपर (भंडारपाल)		१
६.	टाइपिस्ट (टंकक)		१
७.	सहायक पुस्तकालय अध्यक्ष		१
८.	चपरासी		२
९.	सफाई करने वाला/सफाई कर्मचारी		४
१०.	माली		१

संग्रहालय

प्रत्येक संस्थान में पाठ्यक्रम में उल्लिखित क्रूड ड्रग्स, हर्बेरियम शीट्स और दवाओं और पौधों के वानस्पतिक नमूनों का संग्रहालय होगा। इसके अलावा, निम्नलिखित की सिफारिश की जाती है: -

१. औषधीय पौधों की रंगीन स्लाइड;

२. लोकप्रिय पेटेंट दवाओं का प्रदर्शन; तथा

३. दवाओं में आम उपयोग के कंटेनर।

पुस्तकालय

प्रत्येक संस्थान में एक पुस्तकालय होगा जिसमें पाठ्यक्रम में उल्लिखित पुस्तकें और साथ ही वर्तमान औषधीय पत्रिकाएँ भी होनी चाहिए। पुस्तकालय में पुस्तकों को संदर्भित करने के लिए छात्रों और कर्मचारियों के लिए पर्याप्त जगह होनी चाहिए।

नोटः उपरोक्त आवश्यकताएं न्यूनतम आवश्यकताएं हैं और अधिक भौतिक और शिक्षण सुविधा प्रदान करने के लिए संस्थान स्वतंत्र है।

उपकरण

उपकरण और सामग्री की सूची समय-समय पर भारतीय भेषजी परिषद द्वारा तय की जा सकती है।

परिशिष्ट-ख

(देखें विनियमन १६)

परीक्षा प्राधिकारी द्वारा पूरी की जाने वाली शर्तें

१. परीक्षा प्राधिकारी या तो सांविधिक भारतीय विश्वविद्यालय या केंद्र या राज्य सरकार द्वारा गठित निकाय होगा। यह सुनिश्चित करेगा कि परीक्षा केंद्रों पर परीक्षाओं के अनुशासन और शिष्टाचार का सख्ती से पालन हो।

२. यह भारतीय भेषजी परिषद के निरीक्षक या निरीक्षकों को परीक्षाओं का दौरा करने और निरीक्षण करने की अनुमति देगा।

३. यह प्रदान करेगा :-

(क) लिखित परीक्षाओं के लिए आवश्यक फर्नीचर सहित पर्याप्त कक्ष;

(ख) प्रैक्टिकल परीक्षाएं आयोजित करने के लिए उपयुक्त रूप से सुसज्जित प्रयोगशालाएं;

(ग) परीक्षा का संचालन और निरीक्षण के लिए योग्य एवं पर्याप्त संख्या में जिम्मेदार परीक्षक और कर्मचारी; तथा

(घ) ऐसी अन्य सुविधाएं जो परीक्षाओं के कुशल और उचित संचालन के लिए आवश्यक हों;

४. अभ्यर्थी के लिए आवश्यक होने पर, यह परीक्षा प्राधिकारी को निर्धारित शुल्क, यदि कोई है, का भुगतान करने के बाद परीक्षाओं में अभ्यर्थी को प्राप्त अंकों का विवरण प्रदान करेगा।

५. यह परिशिष्ट-ए में दर्शाए गये संबंधित विषयों के शिक्षकों के समान योग्यता वाले परीक्षकों की नियुक्ति करेंगे।

६. भेषजी अधिनियम १९४८ की धारा १२ की उप-धारा (३) के अनुपालन में, परीक्षा प्राधिकारी परीक्षाओं की तिथियाँ तय होने के छः हफ्ते पूर्व ही अग्रिम रूप से भारतीय भेषजी परिषद के सचिव को सूचित करेगा, ऐसी परीक्षाओं की समय-सारणी के बारे में बतायेगा, ताकि परिषद परीक्षाओं के निरीक्षण हेतु व्यवस्था बना सके।

७. चेयरमैन और, फार्मेसी परीक्षाओं के संचालन व परीक्षक की नियुक्ति से संबंधित परीक्षा प्राधिकारी की परीक्षा समिति के कम-से-कम एक विशेषज्ञ सदस्य के पास फार्मेसी की योग्यता मौजूद होनी चाहिए।

परिशिष्ट-ग

{देखें विनियमन १८(१)(iii)}

प्रैक्टिकल ट्रेनिंग के लिए मान्यता प्राप्त करने हेतु संस्थान द्वारा पूरी की जाने वाली शर्तें

१. वह संस्थान, जहाँ छात्र फार्मासिस्ट्स को प्रैक्टिकल ट्रेनिंग दी जाती है, आवश्यकतानुसार समय-समय पर ऐसी जानकारी उपलब्ध करायेगा, जिसे भारतीय भेषजी परिषद द्वारा कर्मचारी, आवास और संबंधित संस्थान के उपकरण व इसके कार्य के बारे में मांगी जा सकती है।

२. संस्थान द्वारा भारतीय भेषजी परिषद के निरीक्षकों को कार्य समय के दौरान किसी भी उपयुक्त समय पर परिसर के निरीक्षण की अनुमति दी जायेगी।

३. छात्र फार्मासिस्टों की देखभाल के लिए, संस्थान कुछ सदस्यों या अपने कर्मचारियों को कार्य सौंपेगा, जो पंजीकृत फार्मासिस्ट होंगे। स्टाफ के ऐसे सदस्य संबंधित संस्था प्रमुख के प्रति जवाबदेह होंगे।

४. संस्थान द्वारा ऐसे अवसर, आवास, उपकरण, सामग्री व संदर्भ पुस्तकें उपलब्ध करायी जायेंगी, जिनकी छात्र फार्मासिस्ट्स की अच्छी तरह से प्रैक्टिकल ट्रेनिंग के लिए आवश्यकता पड़ सकती है।

५. औषधि एवं प्रसाधन नियम, १९४५ और औषधि एवं प्रसाधन अधिनियम, १९४० के तहत लाइसेंस प्राप्त किसी भी अस्पताल, फार्मेसी तथा दवा विक्रेता (केमिस्ट) एवं औषधि विक्रेता (ड्रगिस्ट) में छात्र फार्मासिस्ट्स की संख्या ४ से अधिक न हो, जहाँ एक पंजीकृत फार्मासिस्ट उस

कार्य में शामिल होगा जिसमें छात्र फार्मासिस्ट को प्रैक्टिकल ट्रेनिंग दी जा रही है; और जहाँ एक से अधिक पंजीकृत फार्मासिस्ट इसी तरह काम में लगे हैं, वहाँ ऐसे प्रत्येक अतिरिक्त एवं पंजीकृत फार्मासिस्ट के लिए यह संख्या २ से अधिक नहीं होगी।

६. विनियमन १८ के अंतर्गत मान्यता प्राप्त करने के इच्छुक संस्थान लिखित रूप में सचिव, भारतीय भेषजी परिषद को आवेदन देंगे और बतायेंगे कि वो मान्यता प्राप्त करना चाहते हैं।

७. इस बात की संतुष्टि हो जाने पर कि संस्थान इन नियमों द्वारा तय की गयी शर्तों का पालन करेगा, भारतीय भेषजी परिषद द्वारा इस तरह की मान्यता प्रदान की जायेगी।

८. इन स्थितियों की व्याख्या या अवलोकन से संबंधित कोई भी सवाल पैदा होने पर, भारतीय भेषजी परिषद का निर्णय अंतिम होगा।

परिशिष्ट-घ

{देखें विनियमन १६(१)}

फार्मासिस्टों के लिए प्रैक्टिकल ट्रेनिंग कॉन्ट्रैक्ट फॉर्म

खंड I

यह आवेदन पत्र

_____

(छात्र फार्मासिस्ट का नाम)

पुत्र/पुत्री _____ आवास _____ को जारी किया गया है, जिन्होंने मेरे समक्ष इस आशय का प्रमाण प्रस्तुत किया है कि वह भेषजी अधिनियम, १९४८ की धारा १० के तहत बने शिक्षा विनियमन, २०२० में निर्धारित प्रैक्टिकल ट्रेनिंग लेने के पात्र हैं।

दिनाँकः

प्रायोगिक प्रशिक्षण प्रदान करने वाले संस्थान के प्रमुख

खंड II

मैं _____

(छात्र फार्मासिस्ट का नाम)

_____ के _____

(संस्थान का नाम) (अप्रेंटिस मास्टर का नाम)

_____

(अस्पताल या फार्मेसी) को उपरोक्त प्रशिक्षण के लिए अपने अप्रेंटिस मास्टर के रूप में स्वीकार करता/करती हूँ और अपनी ट्रेनिंग की पूरी अवधि के दौरान मैं इनकी आज्ञा मानूंगा/मानूंगी और उन्हें सम्मान दूंगा/दूंगी।

(छात्र फार्मासिस्ट)

खंड III

मैं _____

(अप्रेंटिस मास्टर का नाम)

_____

(छात्र फार्मासिस्ट का नाम)

को प्रशिक्षु के रूप में स्वीकार करता/करती हूँ और मैं उन्हें अपने संगठन में प्रशिक्षण हेतु ऐसी सुविधाएँ दूंगा/दूंगी जिससे वह अपने प्रशिक्षण काल में निम्नलिखित हासिक कर सकें:

१. फार्मेसी के पेशे को प्रभावित करने वाले विभिन्न कानूनों द्वारा आवश्यक रिकॉर्ड्स के रखरखाव की कार्यात्मक जानकारी; और

२. प्रैक्टिकल (व्यावहारिक) अनुभव में:-

१) ड्रग्स और मेडिकल उपकरणों का संग्रहण (भंडारण)

२) सूची नियंत्रण प्रक्रियाएं

३) पर्चे का रखरखाव

४) वितरण

५) रोगी परामर्श

मैं यह भी मानता हूँ कि उसके/उसकी मार्गदर्शन के लिए एक पंजीकृत फार्मासिस्ट को नियुक्त किया जाएगा

(अप्रेंटिस मास्टर)

(संस्थान का नाम और पता)

खंड IV

मैं यह प्रमाणित करता हूं कि _____(छात्र फार्मासिस्ट का नाम) ने _____ घंटे की _____ महीने के प्रशिक्षण किया जो खंड III में वर्णित विवरण के अनुसार है।

_____

(प्रायोगिक प्रशिक्षण प्रदान करने वाले संस्थान के प्रमुख)

खंड V

मैं प्रमाणित करता हूं कि_____(छात्र फार्मासिस्ट का नाम) ने फार्मेसी अधिनियम, १९४८ की धारा १० के तहत बनाई गई शिक्षा विनियम, **२०२०** के विनियमन १८ के तहत अपने प्रैक्टिकल (व्यावहारिक) प्रशिक्षण को संपूर्ण रूप से पूरा कर लिया है। भारतीय भेषजी परिषद द्वारा अनुमोदित संस्थान में उनका व्यावहारिक प्रशिक्षण हुआ था।

दिनाँक:

_____

(शैक्षणिक संस्थान के प्रमुख)

अर्चना मुदगल, निबन्धक-एवं-सचिव

[विज्ञापन-III/4/असा./298/2020-21]

PHARMACY COUNCIL OF INDIA

NOTIFICATION

New Delhi, the 9th October, 2020

The Education Regulations, 2020 for Diploma Course in Pharmacy

Regulations made under section 10 of the Pharmacy Act, 1948.

(As approved by the Government of India, Ministry of Health & Family Welfare vide letter No. Z-28020/59/2019-AHS/FTS-8012809 dated 7.10.2020 and notified by the Pharmacy Council of India.)

No.14-55/2020-PCI: - In exercise of the powers conferred by section 10 of the Pharmacy Act, 1948 (8 of 1948), the Pharmacy Council of India, with the approval of the Central Government, hereby makes the following regulations, namely:-

CHAPTER 1

1. Short title and commencement- (1) These regulations may be called the Education Regulations, 2020 for Diploma course in Pharmacy.

(2) They shall come into force on the date of their publication in the official Gazette.

2. Qualification for Pharmacist- The minimum qualification required for registration as a pharmacist shall be a pass in Diploma in Pharmacy (Part-I & Part-II) and satisfactory completion of Diploma in Pharmacy (Part-III).

Or

Any other qualification approved by the Pharmacy Council of India as equivalent to the above.

3. Diploma in Pharmacy (Part-I, Part-II and Part-III) shall consist of a certificate of having completed the course of study and passed the examination after satisfactory completing the practical training as prescribed in Chapter-2 and Chapter-3 of these regulations.

CHAPTER 2

4. Diploma in Pharmacy (Part-I and Part-II)-

Minimum qualification for admission to Diploma in Pharmacy-A pass in 10+2 examination (science academic stream) with Physics, Chemistry and Biology or Mathematics.

or

Any other qualification approved by the Pharmacy Council of India as equivalent to the above examination.

Provided that there shall be reservation of seats for the Scheduled Castes and the Scheduled Tribes candidates in accordance with the instructions issued by the Central Government /State Governments /Union territory administrations as the case may be from time to time.

5. Duration of the course-

(1) The duration of the course shall be for two academic years. Each academic year shall be spread over a period of not less than one hundred and eighty working days.

(2) In addition there shall be a five hundred hours of practical training spread over a period of not less than three months.

6. Course of study- The course of study for Diploma in Pharmacy Part-I and Diploma in Pharmacy Part-II shall include the subjects as given in the Tables I & II below. The number of hours devoted to each subject for its teaching in Theory and Practical, shall not be less than that noted against it in columns 2 and 3 of the Tables below. **However, the course of study and practical training may be modified by the Pharmacy Council of India from time to time.**

Table – I
Diploma in Pharmacy (Part - I)

	Number of hours		
Subject	**Theory**	**Practical**	**Tutorial**
Pharmaceutics	75	75	25
Pharmaceutical Chemistry	75	75	25
Pharmacognosy	75	75	25
Human Anatomy & Physiology	75	75	25
Social Pharmacy	75	75	25
Total	**375**	**375**	**125**

Table – II

Diploma in Pharmacy (Part II)

Subject	Number of hours		
	Theory	**Practical**	**Tutorial**
Pharmacology	75	50	25
Community Pharmacy & Management	75	75	25
Biochemistry & Clinical Pathology	75	50	25
Pharmacotherapeutics	75	25	25
Hospital & Clinical Pharmacy	75	25	25
Pharmacy Law & Ethics	75	--	25
Total	**450**	**225**	**150**

TABLE III

Diploma in Pharmacy (Part III)

Practical Training – 500 hours

Activities

1) Stocking of Drugs and Medical Devices
2) Inventory Control Procedures
3) Handling of prescriptions
4) Dispensing (250 hours)
5) Patient counseling

7. Syllabus- The syllabus for each subject of study shall be as prescribed by the Pharmacy Council of India from time to time.

8. Approval of the authority conducting the course of study-

(1) No authority in a State shall start or conduct Diploma in Pharmacy course of study without the prior approval of the Pharmacy Council of India.

(2) The course of regular academic study prescribed under regulation 6 shall be conducted in an institution, approved by the Pharmacy Council of India under sub-section (1) of Section 12 of the Pharmacy Act, 1948.

Provided that the Pharmacy Council of India shall not approve any institution under this regulation unless it provides adequate arrangements for teaching in regard to building, accommodation, equipments and teaching staff etc. as specified in Appendix-A to these regulations which may be amended by the Pharmacy Council of India from time to time.

9. Examinations-

1) There shall be an annual examination at the end of the academic year.

2) If necessary, there shall be a supplementary examination for the students who are not able to pass Diploma in Pharmacy Part-I or Part-II, as the case may be, as per the criteria specified by the examining authority.

3) The examinations shall be of written and practical (including viva – voce) nature, carrying maximum marks for each part of a subject, as indicated in Table IV and V below.

Table – IV
DIPLOMA IN PHARMACY (PART-I) EXAMINATION

	Maximum marks for Theory			Maximum marks for Practicals		
Subject	**Examination**	***Sessional**	**Total**	**Examination**	***Sessional**	**Total**
Pharmaceutics	80	20	100	80	20	100
Pharmaceutical Chemistry	80	20	100	80	20	100
Pharmacognosy	80	20	100	80	20	100
Human Anatomy & Physiology	80	20	100	80	20	100
Social Pharmacy	80	20	100	80	20	100
			500	**+ 500 = 1000**		

*Internal assessment

Table – V

DIPLOMA IN PHARMACY (PART-II) EXAMINATION

	Maximum marks for Theory			Maximum marks for Practicals		
Subject	**Examination**	***Sessional**	**Total**	**Examination**	***Sessional**	**Total**
Pharmacology	80	20	100	80	20	100
Community Pharmacy & Management	80	20	100	80	20	100
Biochemistry & Clinical Pathology	80	20	100	80	20	100
Pharmacotherapeutics	80	20	100	80	20	100

Hospital and Clinical Pharmacy	80	20	100	80	20	100
Pharmacy law & Ethics	80	20	100	-	-	-
			600	**+400**	**+100**	**= 1100**

*Internal assessment

10. Eligibility for appearing at the Diploma in Pharmacy Part-I and Part II examination-

Only such candidates who produce certificate from the Head of the academic institution in which he/she has undergone the Diploma in Pharmacy Part-I and Part-II course in proof of his/her having regularly and satisfactorily undergone the course of study by attending not less than 75% of the classes held both in theory and in practical separately in each subject shall be eligible for appearing at the Diploma in Pharmacy (Part-I) or (Part II) examination, as the case may be.

11. Mode of examinations-

(1) Theory and Practical examination in the subjects mentioned in Tables – IV & V shall be of three hours duration. Both Theory and Practical are considered as two separate papers.

(2) A candidate who fails in theory or practical examination of a subject shall re-appear for the failed subject. Theory and Practical of a particular subject are considered as individual subjects for the purpose of pass criteria.

(3) Practical examination shall also consist of a viva- voce examination.

12. Award of sessional marks and maintenance of records-

(1) A regular record of both theory and practical class work and examinations held in an institution imparting training for diploma in Pharmacy Part-I and diploma in Pharmacy Part-II courses, shall be maintained for each student in the institution and 20 marks for each theory and 20 marks for each practical subject shall be allotted as sessional marks.

(2) There shall be two or more periodic sessional (internal assessment) examinations during each academic year. The highest aggregate of any two performances shall form the basis of calculating sessional marks.

(3) The sessional marks in practicals shall be allotted on the following basis:-

(i) Actual performance in the sessional / spacing examination = 10 marks.

(ii) Day to day assessment in the practical class/spacing work =10 marks.

13. Minimum marks for passing the examination - A student shall not be declared to have passed Diploma in Pharmacy examination unless he/she secures at least 40% marks in each of the subjects separately in the theory as well as the practical examinations, including sessional marks. The candidates securing 60% marks or above in aggregate in all subjects shall be declared to have passed in first class. The candidates securing 75% marks or above in any subject or subjects shall be declared to have passed with distinction in that subject or those subjects. The grant of first class and distinction shall be subject to the condition that the candidate shall pass all the subjects in a single attempt.

14. Eligibility for promotion to Diploma in Pharmacy (Part-II)-

All candidates who have appeared for all the subjects and passed the Diploma in Pharmacy Part-I examination are eligible for promotion to the Diploma in Pharmacy Part-II class. However failure in more than two subjects shall debar him/her from promotion to Diploma in Pharmacy Part II class.

15. Improvement of sessional marks-

The candidates who wish to improve sessional marks can do so, by appearing in two additional sessional examinations during the next academic year. The average score of the two examinations shall be the basis for improved sessional marks in theory as well as in practical. Marks awarded to a candidate for day to day assessment in the practical class cannot be improved unless he/she attends a regular course of study again.

16. Approval of examinations- The examinations mentioned in regulations 9 to 15 shall be held by an authority (hereinafter referred to as the Examining Authority) in a State, which shall be approved by the Pharmacy Council of India under sub-section (2) of section 12 of the Pharmacy Act, 1948. Such approval shall be granted only if the Examining Authority concerned fulfills the conditions as specified in Appendix-B to these regulations.

17. Certificate of passing examination for Diploma in Pharmacy (Part-II)- Certificate of having passed the examination for the Diploma in Pharmacy Part-II shall be granted by the examining authority to a successful student.

CHAPTER-3

Diploma in Pharmacy (Part-III)

(Practical Training)

18. Period and other conditions for practical training-

(1) After having appeared in Part-II examination for the Diploma in Pharmacy held by an approved Examining Authority a candidate shall be eligible to undergo practical training in one or more of the following institutions namely:

(i) Hospitals/Dispensaries run by Central /State Governments.

(ii) A pharmacy licensed for retail sale of drugs under the Drugs and Cosmetics Rules, 1945 having the services of registered pharmacists.

(iii) Hospital and Dispensary other than those specified in sub-regulation (i) above for the purpose of giving practical training shall have to be recognized by Pharmacy Council of India on fulfilling the conditions specified in Appendix-C to these regulations.

(2) The institutions referred in sub-regulation (1) shall be eligible to impart training subject to the condition that number of student pharmacists that may be taken in any hospital, dispensary or pharmacy licensed under the Drugs and Cosmetics Rules, 1945 made under the Drugs and Cosmetics Act, 1940, shall not exceed four where there is one registered pharmacist engaged in the work in which the student pharmacist is undergoing practical training, where there is more than one registered pharmacist similarly engaged, the number shall not exceed two for each additional such registered pharmacist.

(3) In the course of practical training, the trainee shall have exposure to -

(i) Working knowledge of keeping of records required by various Legislative Acts concerning the profession of pharmacy; and

(ii) Practical experience in activities mentioned in Table III under regulation 6 of these regulations.

(4) The practical training shall be not less than five hundred hours spread over a period of not less than three months provided that not less than two hundred and fifty hours are devoted to actual dispensing of prescriptions.

19. Procedure to be followed prior to commencement of the training-.

(1) The head of institution imparting practical training, on application, shall supply in triplicate 'Practical Training Contract Form for Pharmacist' (hereinafter referred to as the Contract Form) to the candidate eligible to undertake the said practical training. The Contract Form shall be as specified in Appendix-D to these regulations.

(2) The head of institution imparting practical training shall fill Section I of the Contract Form. The trainee shall fill Section II of the said Contract Form and the head of the institution agreeing to impart the training (hereinafter referred to as the Apprentice Master) shall fill Section III of the said Contract form.

(3) It shall be the responsibility of the trainee to ensure that one copy (hereinafter referred to as the first copy of the Contract Form) so filled is submitted to the head of institution imparting practical training and the other two copies (hereinafter referred to as the second copy and the third copy) shall be filed with the Apprentice Master (if he so desires) or with the trainee till completion of the training.

20. Certificate of passing Diploma in Pharmacy Part-III-

On satisfactory completion of the practical training period the Apprentice Master shall fill Section IV of the second copy and third copy of the Contract Form and forward it to the head of institution imparting practical training who shall suitably enter in the first copy of the entries from the second copy and the third copy and shall fill Section V of the three copies of Contract Form and thereafter hand over both the second copy and the third copy to the trainee.

This Contract Form, completed in all respects, shall be regarded as a certificate of having successfully completed the course of Diploma in Pharmacy (Part- III).

CHAPTER-4

21. Certificate of Diploma in Pharmacy- A certificate of Diploma in Pharmacy shall be granted by the examining authority to a successful candidate on producing certificates of having passed the Diploma in Pharmacy Part I and Part II and satisfactory completion of practical training for Diploma in Pharmacy (Part-III).

22. Repeal and Savings-

(1) The Education Regulations, 1991 (hereinafter referred to as the said regulations) published by the Pharmacy Council of India vide No. 14-55/87(Part)-PCI/2484-2887 dt.11.7.1992 and all amendments thereto are hereby repealed.

(2) Notwithstanding such repeal,

(a) Anything done or any action taken under the said regulations shall be deemed to have been done or taken under the corresponding provision of these regulations.

(b) A person who was admitted as a student under the said regulations to the course of training for Diploma in Pharmacy and who had not passed the examination at the commencement of these regulations shall be required to pass the examination in accordance with the provisions of the said regulations as if these regulations had not come into force:

Provided however, the Examining Authority in a particular State may fix a date after which the examinations under the said Regulations shall not be conducted.

Appendix-A

(See regulation 8)

Conditions to be fulfilled by the academic institution

Any authority in India applying to the Pharmacy Council of India for approval of courses of study for Pharmacists under sub-section (1) of section 12 of the Pharmacy Act, 1948 shall provide.

(A) ACCOMMODATION

Suitable and sufficient accommodation with adequate ventilation lighting and other hygienic conditions should be provided to the rooms for Principal /Head of the department, office, class room, library, staff, staff common room, students common room, museum, stores etc.

At least four laboratories specified below should be provided for:-

1. Pharmaceutics Lab.
2. Pharm. Chemistry Lab.
3. Physiology, Pharmacology and Pharmacognosy Lab.
4. Biochemistry, Clinical Pathology, Hospital and Clinical Pharmacy Lab.

In addition to the laboratories, balance room, aseptic room or cabinet, a machine room are also to be provided for.

Floor area of the laboratory should not be less than 30 square feet per student required to work in the laboratory at any given time subject to a minimum of 500 square feet.

Laboratories should be fitted and constructed in a manner that these can be kept reasonably clean. Gas and water fittings, shelves, fume cupboards be provided wherever necessary.

The institutions shall provide "Model Pharmacy" as per following details –

Model Pharmacy	No.	Area
Essential : Running Model Community Pharmacy **Desirable** : Drug Model Store	01	80 Sq. Mts. (Including 10 Sq. mt for Drug Information Centre & 10 Sq. mt. for Patient Counseling)

Wherever animal experimentations are prescribed in the curriculum, the required knowledge and skill should be imparted by using computer assisted modules. Animal hold area shall be as per the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA) guidelines.

(B) STAFF

Principal/Director/Professor/Head of Institution /Head of the Department may be engaged in teaching upto eight hours a week, and the work load of other teaching staff should not be more than sixteen hours per week.

Staff student ratio should not exceed 1:60 in theory classes and 1:20 in practical classes. There should be two teachers for a batch of 30 students in practicals. According to the above norms, the following staff is required for an intake of 60 students:

1. Principal/Director/Professor/Head of Institution/Head of the Department	- One
2. Lecturer :	
• M.Pharm/Pharm.D	- Three
• B.Pharm with 3 years of professional experience	- Four

In addition to regular faculty, the institution can have Bachelor of Medicine and Bachelor of Surgery (M.B.B.S) faculty as visiting faculty for teaching Anatomy & Physiology and Biochemistry and Clinical Pathology.

The minimum qualification and experience of the teaching faculty including the Principal/ Director/ Professor/ Head of Institution/ Head of Department and their payscales shall be as prescribed in the Minimum Qualification for Teachers in Pharmacy Institutions Regulations, 2014.

The pay scale of teaching staff shall not be less than the scale of pay prescribed by the State Government/ University Grants Commission/ All India Council for Technical Education for similar category of posts.

Provided that the above qualifications shall not apply to the incumbents appointed under the repealed Education Regulations.

Non-Teaching Staff

List of Non-Teaching staff for the D.Pharm course:

1.	Laboratory Technician (Qualification-Diploma in Pharmacy)	2
2.	Laboratory Attendent	4
3.	Office Superintendent	1
4.	Clerk-cum-Accountant	1
5.	Store-Keeper	1
6.	Typist	1
7.	Asstt. Librarian	1
8.	Peons	2
9.	Cleaners/Sweepers	4
10.	Gardener	1

Museum

Every institution shall maintain a museum of crude drugs, herbarium sheets, botanical specimens of the drugs and plants mentioned in the course. In addition, the following are recommended:-

1. Coloured slides of medicinal plants:
2. Display of popular patent medicines; and
3. Containers of common usage in medicines.

Library

Every institution shall maintain a library which should contain books mentioned in the syllabus and also the current pharmaceutical journals. There should be adequate place in the library for students and staff to refer books.

NOTE: The above requirements are the minimum requirements and the Institution is free to provide more-physical and teaching facility.

Equipments

The list of equipments & apparatus shall be as may be decided by the Pharmacy Council of India from time to time.

Appendix-B

(See regulation 16)

Conditions to be fulfilled by the Examining Authority

1. The Examining Authority shall be either a statutory Indian University or a body constituted by the Central or State Government. It shall ensure that discipline and decorum of the examinations are strictly observed at the examination centers.

2. It shall permit the Inspector or Inspectors of the Pharmacy Council of India to visit and inspect the examinations.

3. It shall provide:-

   (a) adequate rooms with necessary furniture for holding written examinations;

   (b) well-equipped laboratories for holding practical examinations;

   (c) an adequate number of qualified and responsible examiners and staff to conduct and invigilate the examination; and

   (d) such other facilities as may be necessary for efficient and proper conduct of examinations.

4. It shall, if so required by a candidate, furnish the statement of marks secured by a candidate in the examinations after payment of prescribed fee, if any, to the Examining Authority.

5. It shall appoint examiners whose qualifications should be similar to those of the teachers in the respective subjects as shown in Appendix-A.

6. In pursuance of sub-section (3) of section 12 of the Pharmacy Act, 1948, the Examining Authority shall communicate to the Secretary, Pharmacy Council of India not less than six weeks in advance the dates fixed for examinations, the time-table for such examinations, so as to enable the Council to arrange for inspection of the examinations.

7. The Chairman and at least one expert member of Examining Committee of the Examining Authority concerned with appointment of examiners and conduct of pharmacy examinations should be persons possessing pharmacy qualifications.

Appendix-C

[See regulations 18 (1)(iii)]

Conditions to be fulfilled by the institution to be recognised for giving practical training

1. The Institution, where practical training is given to student pharmacists, shall from time to time, if required, furnish such information as may be needed by the Pharmacy Council of India about the staff, accommodation and equipment of the Institution concerned and its working.

2. The Institution shall permit the Inspectors of the Pharmacy Council of India to inspect the premises at any reasonable time while the work is proceeding therein.

3. The Institution shall entrust some member or members of its staff, who shall be registered pharmacist (s), to look after the student pharmacists. Such members of the staff shall be responsible in this behalf to the Head of the Institution concerned.

4. The Institution shall provide such opportunity, accommodation, apparatus, materials and books of reference as may be required to enable the student pharmacists to undergo the practical training properly.

5. The number of student pharmacists that may be taken in any hospital, pharmacy and chemist and druggist licensed under the Drugs and Cosmetics Rules, 1945 made under the Drug and Cosmetics Act, 1940 shall not exceed four where there is one registered pharmacist engaged in the work in which the student pharmacist is undergoing practical training; where there is more than one registered pharmacist similarly engaged, the number shall not exceed two for each additional such registered pharmacist.

6. The Institution wishing to be recognised under regulation 18 shall apply in writing to the Secretary, Pharmacy Council of India stating its desire, to be so recognised.

7. Having satisfied that the institution shall follow the conditions laid down in these rules, the Pharmacy Council of India shall grant such recognition.

8. In the event of any question arising as to the interpretation or observance of these conditions the decision of the Pharmacy Council of India shall be final.

Appendix-D

[See regulations 19(1)]

Practical training contract form for pharmacists

SECTION I

This form has been issued to _____

(Name of student pharmacist)

son of /daughter of _____ residing at _____ who has produced evidence before me that he/she is entitled to receive the Practical Training as set out in the Education Regulations, 2020 made under section 10 of the Pharmacy Act, 1948.

Date:

The Head of Institution imparting practical training

SECTION II

I _____ accept

(Name of the Student Pharmacist)

_____ of _____

(Name of the Apprentice Master) (Name of the Institution)

_____

(Hospital or Pharmacy)

as my Apprentice Master for the above training and agree to obey and respect him /her during the entire period of my training.

(Student Pharmacist)

SECTION III

I, _____ accept

(Name of the Apprentice Master)

_____ as a

(Name of the student pharmacist)

trainee and I agree to give him /her training facilities in my organisation so that during his /her training he /she may acquire:

1. Working knowledge of keeping of records required by the various Acts affecting the profession of pharmacy; and

2. Practical experience in -
    1) Stocking of Drugs and Medical Devices
    2) Inventory control procedures
    3) Handling of prescriptions
    4) Dispensing
    5) Patient counseling

I also agree that a Registered Pharmacist shall be assigned for his /her guidance.

(Apprentice Master)

(Name & address of the Institution)

SECTION IV

I certify that _____ had

(Name of student pharmacists)

has undergone _____ hours training spread over _____ months in

accordance with the details enumerated in SECTION III.

_____

(The Head of Institution imparting practical training)

SECTION V

I certify that _____ has

(Name of student pharmacists)

completed in all respect his practical training under regulation 18 of the Education Regulations, 2020 made under section 10 of the Pharmacy Act, 1948. He had his practical training in an Institution approved by the Pharmacy Council of India.

Date:

_____

(Head of the Academic Institution)

ARCHNA MUDGAL, Registrar-cum-Secy.

[ADVT.-III/4/Exty./298/2020-21]

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PHARMACY COUNCIL OF INDIA

(Constituted under the Pharmacy Act, 1948)

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Maa Anandamai Marg
Okhla Phase I
NEW DELHI – 110 020

Ref. No.14-55/2021-PCI(A)/3642-45 23 SEP 2021

To

a) All institutions approved for D.Pharm Course.

b) All State Governments (Technical Education and Health Departments) and admission making authorities.

c) All Examining Authorities.

Sub: "Syllabus framed under Regulation 7, List of prescribed equipments and apparatus under Appendix-A of The Education Regulations, 2020 for Diploma Course in Pharmacy."

Sir/Madam

With reference to the subject cited above, it is informed that -

1. With due approval of the Ministry of Health and Family Welfare, Government of India, PCI has notified the Education Regulations, 2020 for Diploma course in Pharmacy in the Gazette of India, Extraordinary No. 435, Part-III, Section-4, dt.16.10.2020.

2. As empowered under regulation 7 and Appendix-A of ER-20, the PCI has framed the syllabus. A copy of the same titled as under is enclosed as **Annexure-I.**

   "Syllabus framed under Regulation 7, List of prescribed equipments and apparatus under Appendix-A of The Education Regulations, 2020 for Diploma Course in Pharmacy."

3. It is for implementation and strict compliance from 2021-2022 academic session.

Yours faithfully

(ARCHNA MUDGAL)
Registrar-cum-Secretary

Annexure - I

Pharmacy Council of India
New Delhi

"Syllabus framed under Regulation 7, List of prescribed equipments and apparatus under Appendix-A of The Education Regulations, 2020 For Diploma Course in Pharmacy"

COMMITTEE MEMBERS

S. No.	Name	Affiliation	Role
1.	Dr. B. Suresh	President, Pharmacy Council of India, New Delhi	Ex-Officio
2.	Dr. Shailendra Saraf	Vice President, Pharmacy Council of India, New Delhi	Ex-Officio
3.	Dr. V. Gopal	Member, Pharmacy Council of India, (Puducherry)	Convener
4.	Dr. B. Jayakar	Member, Pharmacy Council of India, (Tamil Nadu)	Member
5.	Sri Kumar Ajay	Member, Pharmacy Council of India, (Bihar)	Member
6.	Dr. H. Lalhlenmawia	Member, Pharmacy Council of India, (Mizoram)	Member
7.	Dr. R. Debnath	Member, Pharmacy Council of India, (West Bengal)	Member
8.	Shri Annada Sankar Das	Member, Pharmacy Council of India, (Orissa)	Member
9.	Dr. Priyashree Sunita	Member, Pharmacy Council of India, (Jharkhand)	Member
10.	Dr. Mannava Radhakrishna Murthy	Member, Pharmacy Council of India, (Andhra Pradesh)	Member
11.	Shri Prakash Jeevandas Wanjari	Member, Pharmacy Council of India, (Maharashtra)	Member
12.	Shri K.R. Dinesh Kumar	Member, Pharmacy Council of India, (Kerala)	Member
13.	Mrs. Manjiri Sandeep Gharat	Principal I/c., Prin. K.M. Kundnani Pharmacy Polytechnic, Ulhasnagar, Maharashtra	Member
14.	Shri Raj Vaidya	Community Pharmacist, Hindu Pharmacy, Goa	Member
15.	Dr. R.N. Gupta	Professor, Birla Institute of Technology, Ranchi, Jharkhand.	Member
16.	Dr. K.P. Arun	Associate Professor, JSS College of Pharmacy, Ooty, Tamil Nadu	Member
17.	Dr. Neeraj Upmanyu	Professor & Dean, School of Pharmacy & Research, People's University Bhopal, Madhya Pradesh	Special Invitee

CONTENTS

1. Preamble

"Revamping the curriculum, pedagogy, assessment, and student support" is one of the vision statements and recommendations of the National Education Policy (NEP) of Govt. of India for attaining enhanced learning experiences by the students. In light of this, Pharmacy Council of India, the apex body regulating the pharmacy education in the country, committed to revise the education regulations of Diploma in Pharmacy (D.Pharm) program and thus, the 'Education Regulations 2020' (ER-2020) has been notified in the Gazette of India in October 2020. This new regulation has given due consideration for the fact that, universally the role of pharmacist has undergone continuous evolution from 'dispenser of medicines' to 'medicine expert' in the multidisciplinary health care team.

Accordingly, the courses (course means the subject) of the existing education regulations (ER-91) have been revisited, compared with the present and future needs of the society, expectations of the healthcare team and other stakeholders from the pharmacists were assessed, feedback from the experts in the pharmacy and other healthcare professions were sought. Thus, the course of study prescribed in ER-2020 is an amalgamation of all such exercises to arrive at a curriculum structure for D.Pharm that is more relevant to the current practice standards, dynamic to accommodate and address the upcoming changes.

Though the total number of courses across the program remain 21 as that of ER-91, the number of theory courses is reduced from 12 to 11 in the new regulation, while the number of practical courses is increased from 9 to 10. Further, the theory teaching hours across the program have been reduced from 850 to 825, while the practical hours have been increased from 750 to 800 in the new regulation. Three practical courses have been introduced for the first time in ER-2020. Further, about 275 hours have been assigned for the first time in D.Pharm curriculum for 'Tutorial' activities. All such changes explicitly reveal that the ER-2020 is intended to provide a little edge to the experiential learning through the practical courses and encourages the small group teaching-learning, self-directed learning, etc. in the tutorial hours.

Introduction of 'Pharmacotherapeutics' courses (theory and practical) is one of the revolutionary changes in the new curriculum, that will help the students to hone their knowledge and skills in the area of pharmaceutical care services which will certainly redefine the roles of the D.Pharm qualified pharmacists in both community and hospital settings. Also, the introduction of 'Social Pharmacy' courses (theory and practical) will provide insights about the primary and preventive healthcare concepts in the country and the potential roles of pharmacists in such healthcare segments.

In this backdrop, the Council has formulated a Committee which comprised of 16 Members who have rich experiences in various domains such as education, hospital

pharmacy practice, community pharmacy practice, clinical pharmacy practice, administrative and regulatory affairs to design the syllabus for the individual theory and practical courses as per the curriculum framework defined in ER-2020. The Committee with its clear understanding about the philosophy and objectives of the ER-2020, drafted the syllabus for individual theory and practical courses with utmost care to avoid repetitions, redundancy, over/under utilization of hours, etc. Every course is defined with scope, set of course objectives and course outcomes which will help to understand the significance and the expectations of the course from both teachers and students. Lots of scope has been given in the syllabus for the active learning by the students through the assignment topics and field visit activities which will enhance their critical thinking, searching scientific literatures, interpretational skills and communication skills.

According to the ER-2020 curriculum framework, the students do not earn any credits based on the academic hours they spend. However, as per the conventional methodology of credit calculations, the curriculum of ER-2020 shall be deemed equivalent to 80 credits that shall be used for the administrative purposes, wherever necessary.

Further, the 'Competencies for the Indian D.Pharm Holders' based on the knowledge, skill, attitude and value that are essential for the successful practice of the profession have been derived. These competencies have also been mapped with the individual courses of the curriculum based on the expected outcomes of the individual course. Thus, the courses and the competencies are interlaced in such a way that multiple courses contribute to build one competency and one course contributes to build more than one competency, which reveal the strength of the competency mapping.

The Council strongly believes that the ER-2020 regulations, curriculum and syllabus will uplift the knowledge and skills of the students on par with the contemporary and future professional demands and enable them to be a successful practitioner in the chosen field of pharmacy.

By considering the substantial changes and inclusion of advanced and current subject matters in the new syllabus, the Council shall conduct series of meetings, seminars, conferences, workshops, and webinars for the faculty members handling D.Pharm courses and equip them to deliver such new courses / topics more effectively and efficiently.

The Council appreciate all the efforts of the Members for successfully bringing out the Education Regulations 2020, curriculum and syllabus. Also, profound gratitude to all the stakeholders who contributed directly or indirectly in completing this task.

2. Competencies for the Indian D.Pharm Holders

Competency is defined as "A distinct composite of knowledge, skill, attitude and value that is essential to the practice of the profession in real life contexts".

The candidates who successfully complete the Diploma in Pharmacy (D.Pharm) program of Education Regulations 2020 (ER-2020), from the institutions approved by the Pharmacy Council of India are expected to attain the following professional competencies.

1. Review Prescriptions
2. Dispense Prescription / Non-Prescription Medicines
3. Provide Patient Counselling / Education
4. Hospital and Community Pharmacy Management
5. Expertise on Medications
6. Proficiency on drugs / pharmaceuticals
7. Entrepreneurship and Leadership
8. Deliver Primary and Preventive Healthcare
9. Professional, Ethical and Legal Practice
10. Continuing Professional Development

1. Review Prescriptions: The student should receive and handle prescriptions in a professional manner and be able to check for their completeness and correctness. Also, the prescribers should be contacted for any clarifications and corrections in the prescriptions with suggestions if any.

2. Dispense Prescription / Non-Prescription Medicines: The student should be able to dispense the various scheduled drugs / medicines as per the implications of the Drug & Cosmetics Act and Rules thereunder. Also, the non-prescription medicines (over-the-counter drugs) should be dispensed judicially to the patients as required.

3. Provide Patient Counselling / Education: The student should be able to effectively counsel / educate the patients / caretakers about the prescription / non-prescription medicines and other health related issues. Effective communication includes using both oral and written communication skills and various communication techniques.

4. Hospital and Community Pharmacy Management: The student should be able to manage the drug distribution system as per the policies and guidelines of the hospital pharmacy, good community pharmacy practice and the recommendations of regulatory agencies. Also, be able to manage the procurement, inventory, and distribution of medicines in hospital / community pharmacy settings.

5. Expertise on Medications: The student should be able to provide an expert opinion on medications to health care professionals on safe and effective medication-use, relevant policies and procedures based on available evidences.

6. Proficiency on Pharmaceutical Formulations: The student should be able to describe the chemistry, characteristics, types, merits and demerits of both drugs and excipients used in pharmaceutical formulations based on her/his knowledge and scientific resources.

7. Entrepreneurship and Leadership: The student should be able to acquire the entrepreneurial skills in the dynamic professional environments. Also, be able to achieve leadership skills through teamwork and sound decision-making skills.

8. Deliver Primary and Preventive Healthcare: The student should be able to contribute to various healthcare programs of the nation including disease prevention initiatives to improve public health. Also contribute to the promotion of national health policies.

9. Professional, Ethical and Legal Practice: The student should be able to deliver professional services in accordance with legal, ethical, and professional guidelines with integrity.

10. Continuing Professional Development: The student should be able to recognize the gaps in the knowledge and skills in the effective delivery of professional services from time to time and be self-motivated to bridge such gaps by attending continuing professional development programs.

3. Competency Mapping with the Courses (Part I, II & III) of Education Regulations 2020

Competencies	Pharmaceutics	Pharmaceutical Chemistry	Pharmacognosy	Human Anatomy & Physiology	Social Pharmacy	Pharmacology	Community Pharmacy & Management	Biochemistry & Clinical Pathology	Pharmacotherapeutics	Hospital & Clinical Pharmacy	Pharmacy Law & Ethics	Practical Training
1. Review the Prescriptions	√	√	√	√		√	√	√	√	√	√	√
2. Dispense Prescription / Non-Prescription Medicines	√	√	√		√	√	√	√	√	√	√	√
3. Provide Patient Counselling / Education	√	√	√	√	√	√	√	√	√	√	√	√
4. Hospital and Community Pharmacy Management					√		√			√	√	√
5. Expertise on Medications	√	√	√	√	√	√	√	√	√	√	√	√
6. Proficiency on Pharmaceutical Formulations	√	√	√			√			√			√
7. Entrepreneurship and Leadership							√			√		√
8. Deliver Primary and Preventive Healthcare				√	√	√	√	√	√	√	√	√
9. Professional, Ethical and Legal Practice					√		√		√	√	√	√
10. Continuing Professional Development	√	√	√		√	√	√		√	√	√	√

4. ER-2020 D.Pharm Syllabus – An Overview

The ER-2020 D.Pharm Syllabus has the following structure in every course. Though the theory and practical courses are not mutually exclusive, as per the Regulations, the theory and practical are to be considered as individual courses.

Scope: These are broader statements on the purpose of the course in the curriculum, key contents of the course that will contribute to the specific knowledge and or skill developments. The teacher is expected to orient the students about the scope of the particular course at the beginning and intermittently.

Course Objectives: The course objectives describe the key topics that are intended by the teacher to be covered in the course. In general, these are more specific than the scope and broader than the course outcomes. The teacher is expected to discuss the objectives of the course with the students and break-down the course objectives into micro levels as objectives of a specific topic / objectives of a specific lecture, etc. Such an exercise shall make the students to understand the significance of the course / topic / lecture and enhance their attention on the course / topic / lecture.

Course Outcomes: The course outcomes are more specific than the course objectives describe that describe the abilities of the students to perform/act, upon successful completion of the course. Hence, conventionally the course outcomes are described with verbs that are measurable or observable actions. The teacher is expected to describe the desired outcomes of the particular course, so that the students shall understand the various assessment criteria, modalities, and parameters. This also serves as a broader guideline for the teachers for preparing the assessment plan. A well-structured assessment plan associated with the course outcomes shall enable to mapping with the professional competencies and their attainment levels that are attributed to the program outcomes.

Theory Courses: The theory courses basically provide concepts and explain the relationships between the concepts. Understanding of the theoretical courses enable the students to identify the problems in real life situation and make a plan for addressing such problems. Also, the theory course helps to understand what is not known and thus is the tool for accumulation of knowledge. The syllabus of the theory courses has been systematically and logically described as different chapters and the minimum number of hours to be spent on teaching are mentioned chapter wise and course wise. The teachers shall further distribute the total hours of any given chapter among the sub-topics as required by the subject matter.

Practical Courses: The practical courses are designed for applying the theoretical knowledge in the given experimental / simulated conditions. The practical courses deepen the understanding of theories, develop the skills, hone professional competencies, provide opportunities to observe, think and analyse problem solving methods. Further, they help to gain experience with the real things in practice. The teachers shall train the students in actual / simulated practical conditions.

Tutorials: The purpose of the tutorial hour is typically to engage the students in smaller groups in order to pay a closer attention on their learning process. This is an opportunity for the students to complete their assignments, develop specific skills, discuss any problems in the study topics in a less formal way. During the tutorial hour, the students shall exchange their ideas within the small group, and learn to accept constructive criticism and listen to others. Also, the tutorial hour enables the teachers to closely monitor the progress of the individual student and provide additional academic support to individuals, if necessary.

Assignments: The purpose the assignments are to encourage the students for self-directed learning. Further, the assignments will provoke critical thinking, enhance the skills such as literature search, data mining, data interpretation, report formatting, time-management, and written communication. This is also a mode of self-assessment for the student about the level of understanding of the concepts of a particular course. The teachers shall apply their knowledge and wisdom in choosing the assignment topics at a micro level in alignment with the topics given in the syllabus. The assignments shall be evaluated against a set of criteria. A typical format for the assessment of an assignment is given in Appendix--1.

Field Visits: The purpose of field visits is to provide a real-world experience to the students. The field visits will help them to realize that what they learn within the walls of the classroom / laboratory can help them solve the problems they see in the world around them. Also, this is helpful to the teachers to widen their horizons of knowledge and broadening the scope of the syllabus. Every student shall submit a report describing their objectives, experience, learning points, etc. pertaining to the field trip, in the typical format given in Appendix-2.

Recommended Books: For each course, a list of recommended books is given in the syllabus. The list shall be considered as an important and common resource for the teaching-learning process, but not the complete list. It is always encouraged to use the latest edition of the books specified. Further, the teachers and students are encouraged to explore more primary, secondary, and tertiary resources as required.

Practical Training: The goal of the practical training for the students is to provide a real-time, supervised experience on the professional tasks emphasised in their course of study. Further, it helps them to apply their acquired knowledge and skills in the professional working environment. The practical training intensively prepares the students with adequate competencies and qualifications required for the career opportunity in the future.

Thus, the ER 2020 D.Pharm syllabus is designed to nurture the students in all the three domains of Bloom's Taxonomy viz. cognitive (knowledge), affective (attitude) and psychomotor (skills). Further, it also provides ample of scope to the students for different learning styles viz. visual, auditory and kinaesthetic, i.e., 'see, hear and do'.

The summary of the curriculum, courses and other activities and their metrics across the ER-2020 D.Pharm program (Part I, II & III) are given here.

Criteria	Metrics
Number of subject areas (considering both theory & practical together)	11
Number of theory courses	11
Number of practical courses	10
Number of theory hours	825
Number of practical hours	600
Number of practical training hours	500
Number of tutorial hours	275
Number of course outcomes for theory courses	45
Number of course outcomes for practical courses	40
Number of courses which have given assignments	9
Number of assignment topics given	75
Number of assignments reports each student shall submit	27
Number of courses which have field visit	5
Number of field visit reports each student shall submit	9
Number of professional competencies	10

5. Guidelines for the conduct of theory examinations

Sessional Examinations

There shall be two or more periodic sessional (internal assessment) examinations during each academic year. The duration of the sessional exam shall be 90 minutes. The highest aggregate of any two performances shall form the basis of calculating the sessional marks. The scheme of the question paper for theory sessional examinations shall be as given below.

I. Long Answers (Answer 3 out of 4)	3 x 5 = 15
II. Short Answers (Answer 5 out of 6)	5 x 3 = 15
III. Objective type Answers (Answer all 10 out of 10) (Multiple Choice Questions / Fill-in the Blanks / One word OR one Sentence questions)	10 x 1 =10
Total =	40 marks

Internal assessment: The marks secured by the students out of the total 40 shall be reduced to 20 in each sessional, and then the internal assessment shall be calculated based on the best two averages for 20 marks.

Final Board / University Examinations

The scheme of the question paper for the theory examinations conducted by the examining authority (Board / University) shall be as given below. The duration of the final examination shall be 3 hours.

I. Long Answers (Answer 6 out of 7)	=	6 x 5 = 30
II. Short Answers (Answer 10 out of 11)	=	10 x 3 = 30
III. Objective type Answers (Answer all 20) (Multiple Choice Questions / Fill-in the Blanks / One word OR one Sentence questions)	=	20 x 1 = 20
Total	=	80 marks

6. Guidelines for the conduct of practical examinations

Sessional Examinations

There shall be two or more periodic sessional (internal assessment) practical examinations during each academic year. The duration of the sessional exam shall be three hours. The highest aggregate of any two performances shall form the basis of calculating the sessional marks. The scheme of the question paper for practical sessional examinations shall be as given below.

I. Synopsis	=	10
II. Experiments	=	50*
III. Viva voce	=	10
IV. Practical Record Maintenance	=	10
Total	=	80 marks

* The marks for the experiments shall be divided into various categories, viz. major experiment, minor experiment, spotters, etc. as per the requirement of the course.

Internal assessment: The marks secured by the students out of the total of 80 shall be reduced to 10 in each sessional, and then the internal assessment shall be calculated based on the best two averages for 10 marks from the sessional and other 10 marks shall be awarded as per the details given below.

Actual performance in the sessional examination	= 10 marks
Assignment marks (Average of three)	= 5 marks*
Field Visit Report marks (Average for the reports)	= 5 marks$
Total	= 20 marks

*, $ Only for the courses given with both assignments and field visit/s

Note:

1. For the courses having either assignments or field visit/s, the assessments of assignments or field visit/s shall be done directly for 10 marks and added to the sessional marks.
2. For the courses not having both assignment and field visit, the whole 20 marks shall be calculated from the sessional marks.

Final Board / University Examinations

The scheme of the question paper for the practical examinations conducted by the examining authority (Board / University) shall be as given below. The duration of the final examination shall be 3 hours.

I. Synopsis	=	10
II. Experiments	=	60*
III. Viva voce	=	10
Total	=	80 marks

* The marks for the experiments shall be divided into various categories, viz. major experiment, minor experiment, spotters, etc. as per the requirement of the course.

7. ER-2020 D.Pharm Syllabus – Part I

S. No.	Course Code	Name of the Course	Total Theory / Practical Hours	Total Tutorial Hours	Theory / Practical Hours per Week	Tutorial Hours per Week
1.	ER20-11T	Pharmaceutics – Theory	75	25	3	1
2.	ER20-11P	Pharmaceutics – Practical	75	-	3	-
3.	ER20-12T	Pharmaceutical Chemistry – Theory	75	25	3	1
4.	ER20-12P	Pharmaceutical Chemistry – Practical	75	-	3	-
5.	ER20-13T	Pharmacognosy – Theory	75	25	3	1
6.	ER20-13P	Pharmacognosy – Practical	75	-	3	-
7.	ER20-14T	Human Anatomy & Physiology – Theory	75	25	3	1
8.	ER20-14P	Human Anatomy & Physiology – Practical	75	-	3	-
9.	ER20-15T	Social Pharmacy – Theory	75	25	3	1
10.	ER20-15P	Social Pharmacy – Practical	75	-	3	-

PHARMACEUTICS – THEORY

Course Code: ER20-11T **75 Hours (3 Hours/week)**

Scope: This course is designed to impart basic knowledge and skills on the art and science of formulating and dispensing different pharmaceutical dosage forms.

Course Objectives: This course will discuss the following aspects of pharmaceutical dosage forms

1. Basic concepts, types and need
2. Advantages and disadvantages, methods of preparation / formulation
3. Packaging and labelling requirements
4. Basic quality control tests, concepts of quality assurance and good manufacturing practices

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Describe about the different dosage forms and their formulation aspects
2. Explain the advantages, disadvantages, and quality control tests of different dosage forms
3. Discuss the importance of quality assurance and good manufacturing practices

Chapter	Topics	Hours
1	• History of the profession of Pharmacy in India in relation to Pharmacy education, industry, pharmacy practice, and various professional associations. • Pharmacy as a career • Pharmacopoeia: Introduction to IP, BP, USP, NF and Extra Pharmacopoeia. Salient features of Indian Pharmacopoeia	7
2	**Packaging materials**: Types, selection criteria, advantages and disadvantages of glass, plastic, metal, rubber as packaging materials	5
3	**Pharmaceutical aids:** Organoleptic (Colouring, flavouring, and sweetening) agents **Preservatives:** Definition, types with examples and uses	3
4	**Unit operations:** Definition, objectives/applications, principles, construction, and workings of:	9
	Size reduction: hammer mill and ball mill	
	Size separation: Classification of powders according to IP, Cyclone separator, Sieves and standards of sieves	

	Mixing: Double cone blender, Turbine mixer, Triple roller mill and Silverson mixer homogenizer	
	Filtration: Theory of filtration, membrane filter and sintered glass filter	
	Drying: working of fluidized bed dryer and process of freeze drying	
	Extraction: Definition, Classification, method, and applications	
5	**Tablets** – coated and uncoated, various modified tablets (sustained release, extended-release, fast dissolving, multi-layered, etc.)	8
	Capsules - hard and soft gelatine capsules	4
	Liquid oral preparations - solution, syrup, elixir, emulsion, suspension, dry powder for reconstitution	6
	Topical preparations - ointments, creams, pastes, gels, liniments and lotions, suppositories, and pessaries	8
	Nasal preparations, Ear preparations	2
	Powders and granules - Insufflations, dusting powders, effervescent powders, and effervescent granules	3
	Sterile formulations – Injectables, eye drops and eye ointments	6
	Immunological products: Sera, vaccines, toxoids, and their manufacturing methods.	4
6	**Basic structure, layout, sections, and activities of pharmaceutical manufacturing plants** **Quality control and quality assurance**: Definition and concepts of quality control and quality assurance, current good manufacturing practice (cGMP), Introduction to the concept of calibration and validation	5
7	**Novel drug delivery systems:** Introduction, Classification with examples, advantages, and challenges	5

PHARMACEUTICS – PRACTICAL

Course Code: ER20-11P **75 Hours (3 Hours/week)**

Scope: This course is designed to train the students in formulating and dispensing common pharmaceutical dosage forms.

Course Objectives: This course will discuss and train the following aspects of preparing and dispensing various pharmaceutical dosage forms

1. Calculation of working formula from the official master formula

2. Formulation of dosage forms based on working formula
3. Appropriate Packaging and labelling requirements
4. Methods of basic quality control tests

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Calculate the working formula from the given master formula
2. Formulate the dosage form and dispense in an appropriate container
3. Design the label with the necessary product and patient information
4. Perform the basic quality control tests for the common dosage forms

Practicals

1. Handling and referring the official references: Pharmacopoeias, Formularies, etc. for retrieving formulas, procedures, etc.

2. Formulation of the following dosage forms as per monograph standards and dispensing with appropriate packaging and labelling
   - **Liquid Oral:** Simple syrup, Piperazine citrate elixir, Aqueous Iodine solution
   - **Emulsion:** Castor oil emulsion, Cod liver oil emulsion
   - **Suspension:** Calamine lotion, Magnesium hydroxide mixture
   - **Ointment:** Simple ointment base, Sulphur ointment
   - **Cream:** Cetrimide cream
   - **Gel:** Sodium alginate gel
   - **Liniment:** Turpentine liniment, White liniment BPC
   - **Dry powder:** Effervescent powder granules, Dusting powder
   - **Sterile Injection:** Normal Saline, Calcium gluconate Injection
   - **Hard Gelatine Capsule:** Tetracycline capsules
   - **Tablet:** Paracetamol tablets
3. Formulation of at least five commonly used cosmetic preparations – e.g. cold cream, shampoo, lotion, toothpaste etc

4. Demonstration on various stages of tablet manufacturing processes

5. Appropriate methods of usage and storage of all dosage forms including special dosage such as different types of inhalers, spacers, insulin pens
6. Demonstration of quality control tests and evaluation of common dosage forms viz. tablets, capsules, emulsion, sterile injections as per the monographs

Assignments

The students shall be asked to submit written assignments on the following topics (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

1. Various systems of measures commonly used in prescribing, compounding and dispensing practices
2. Market preparations (including Fixed Dose Combinations) of each type of dosage forms, their generic name, minimum three brand names and label contents of the dosage forms mentioned in theory/practical
3. Overview of various machines / equipments / instruments involved in the formulation and quality control of various dosage forms / pharmaceutical formulations.
4. Overview of extemporaneous preparations at community / hospital pharmacy vs. manufacturing of dosage forms at industrial level
5. Basic pharmaceutical calculations: ratios, conversion to percentage fraction, alligation, proof spirit, isotonicity

Field Visit

The students shall be taken for an industrial visit to pharmaceutical industries to witness and understand the various processes of manufacturing of any of the common dosage forms viz. tablets, capsules, liquid orals, injectables, etc. Individual reports from each student on their learning experience from the field visit shall be submitted.

PHARMACEUTICAL CHEMISTRY – THEORY

Course Code: ER20-12T **75 Hours (3 Hours/week)**

Scope: This course is designed to impart basic knowledge on the chemical structure, storage conditions and medicinal uses of organic and inorganic chemical substances used as drugs and pharmaceuticals. Also, this course discusses the impurities, quality control aspects of chemical substances used in pharmaceuticals.

Course Objectives: This course will discuss the following aspects of the chemical substances used as drugs and pharmaceuticals for various disease conditions

1. Chemical classification, chemical name, chemical structure
2. Pharmacological uses, doses, stability and storage conditions
3. Different types of formulations / dosage form available and their brand names
4. Impurity testing and basic quality control tests

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Describe the chemical class, structure and chemical name of the commonly used drugs and pharmaceuticals of both organic and inorganic nature
2. Discuss the pharmacological uses, dosage regimen, stability issues and storage conditions of all such chemical substances commonly used as drugs
3. Describe the quantitative and qualitative analysis, impurity testing of the chemical substances given in the official monographs
4. Identify the dosage form & the brand names of the drugs and pharmaceuticals popular in the marketplace

Chapter	Topic	Hours
1	**Introduction to Pharmaceutical chemistry:** Scope and objectives **Sources and types of errors:** Accuracy, precision, significant figures **Impurities in Pharmaceuticals**: Source and effect of impurities in Pharmacopoeial substances, importance of limit test, Principle and procedures of Limit tests for chlorides, sulphates, iron, heavy metals and arsenic.	8
2	**Volumetric analysis**: Fundamentals of volumetric analysis, Acid-base titration, non-aqueous titration, precipitation titration, complexometric titration, redox titration **Gravimetric analysis:** Principle and method.	8

3	**Inorganic Pharmaceuticals**: Pharmaceutical formulations, market preparations, storage conditions and uses of • **Haematinics:** Ferrous sulphate, Ferrous fumarate, Ferric ammonium citrate, Ferrous ascorbate, Carbonyl iron • **Gastro-intestinal Agents:** Antacids :Aluminium hydroxide gel, Magnesium hydroxide, Magaldrate, Sodium bicarbonate, Calcium Carbonate, Acidifying agents, Adsorbents, Protectives, Cathartics • **Topical agents:** Silver Nitrate, Ionic Silver, Chlorhexidine Gluconate, Hydrogen peroxide, Boric acid, Bleaching powder, Potassium permanganate • **Dental products:** Calcium carbonate, Sodium fluoride, Denture cleaners, Denture adhesives, Mouth washes • **Medicinal gases:** Carbon dioxide, nitrous oxide, oxygen	**7**
4	Introduction to nomenclature of organic chemical systems with particular reference to heterocyclic compounds containing up to Three rings	**2**
Study of the following category of medicinal compounds with respect to classification, chemical name, chemical structure (compounds marked with*) uses, stability and storage conditions, different types of formulations and their popular brand names		
5	**Drugs Acting on Central Nervous System** • **Anaesthetics:** Thiopental Sodium*, Ketamine Hydrochloride*, Propofol • **Sedatives and Hypnotics:** Diazepam*, Alprazolam*, Nitrazepam, Phenobarbital* • **Antipsychotics:** Chlorpromazine Hydrochloride*, Haloperidol*, Risperidone*, Sulpiride*, Olanzapine, Quetiapine, Lurasidone • **Anticonvulsants:** Phenytoin*, Carbamazepine*, Clonazepam, Valproic Acid*, Gabapentin*, Topiramate, Vigabatrin, Lamotrigine • **Anti-Depressants:** Amitriptyline Hydrochloride*, Imipramine Hydrochloride*, Fluoxetine*, Venlafaxine, Duloxetine, Sertraline, Citalopram, Escitalopram, Fluvoxamine, Paroxetine	**9**
6	**Drugs Acting on Autonomic Nervous System** • **Sympathomimetic Agents:** ***Direct Acting:*** Nor-Epinephrine*, Epinephrine, Phenylephrine,	**9**

	Dopamine*, Terbutaline, Salbutamol (Albuterol), Naphazoline*, Tetrahydrozoline. ***Indirect Acting Agents:*** Hydroxy Amphetamine, Pseudoephedrine. Agents With Mixed Mechanism: Ephedrine, Metaraminol • **Adrenergic Antagonists:** Alpha Adrenergic Blockers: Tolazoline, Phentolamine • Phenoxybenzamine, Prazosin. Beta Adrenergic Blockers: Propranolol*, Atenolol*, Carvedilol • **Cholinergic Drugs and Related Agents:** Direct Acting Agents: Acetylcholine*, Carbachol, And Pilocarpine. Cholinesterase Inhibitors: Neostigmine*, Edrophonium Chloride, Tacrine Hydrochloride, Pralidoxime Chloride, Echothiopate Iodide • **Cholinergic Blocking Agents:** Atropine Sulphate*, Ipratropium Bromide ***Synthetic Cholinergic Blocking Agents***: Tropicamide, Cyclopentolate Hydrochloride, Clidinium Bromide, Dicyclomine Hydrochloride*	
7	**Drugs Acting on Cardiovascular System** • **Anti-Arrhythmic Drugs**: Quinidine Sulphate, Procainamide Hydrochloride, Verapamil, Phenytoin Sodium*, Lidocaine Hydrochloride, Lorcainide Hydrochloride, Amiodarone and Sotalol • **Anti-Hypertensive Agents**: Propranolol*, Captopril*, Ramipril, Methyldopate Hydrochloride, Clonidine Hydrochloride, Hydralazine Hydrochloride, Nifedipine, • **Antianginal Agents**: Isosorbide Dinitrate	5
8	**Diuretics:** Acetazolamide, Frusemide*, Bumetanide, Chlorthalidone, Benzthiazide, Metolazone, Xipamide, Spironolactone	2
9	**Hypoglycemic Agents:** Insulin and Its Preparations, Metformin*, Glibenclamide*, Glimepiride, Pioglitazone, Repaglinide, Gliflozins, Gliptins	3
10	**Analgesic And Anti-Inflammatory Agents:** Morphine Analogues, Narcotic Antagonists; ***Nonsteroidal Anti-Inflammatory Agents (NSAIDs)*** - Aspirin*, Diclofenac, Ibuprofen*, Piroxicam, Celecoxib, Mefenamic Acid, Paracetamol*, Aceclofenac	3
11	**Anti-Infective Agents** • **Antifungal Agents:** Amphotericin-B, Griseofulvin, Miconazole, Ketoconazole*, Itraconazole, Fluconazole*, Naftifine Hydrochloride	8

	• **Urinary Tract Anti-Infective Agents:** Norfloxacin, Ciprofloxacin, Ofloxacin*, Moxifloxacin, • **Anti-Tubercular Agents:** INH*, Ethambutol, Para Amino Salicylic Acid, Pyrazinamide, Rifampicin, Bedaquiline, Delamanid, Pretomanid* • **Antiviral Agents:** Amantadine Hydrochloride, Idoxuridine, Acyclovir*, Foscarnet, Zidovudine, Ribavirin, Remdesivir, Favipiravir • **Antimalarials:** Quinine Sulphate, Chloroquine Phosphate*, Primaquine Phosphate, Mefloquine*, Cycloguanil, Pyrimethamine, Artemisinin • **Sulfonamides:** Sulfanilamide, Sulfadiazine, Sulfametho xazole, Sulfacetamide*, Mafenide Acetate, Cotrimoxazole, Dapsone*	
12	**Antibiotics:** Penicillin G, Amoxicillin*, Cloxacillin, Streptomycin, ***Tetracyclines:*** Doxycycline, Minocycline, ***Macrolides:*** Erythromycin, Azithromycin, ***Miscellaneous:*** Chloramphenicol* Clindamycin	**8**
13	**Anti-Neoplastic Agents:** Cyclophosphamide*, Busulfan, Mercaptopurine, Fluorouracil*, Methotrexate, Dactinomycin, Doxorubicin Hydrochloride, Vinblastine Sulphate, Cisplatin*, Dromostanolone Propionate	**3**

PHARMACEUTICAL CHEMISTRY – PRACTICAL

Course Code: ER20-12P **75 Hours (3 Hours/week)**

Scope: This course is designed to impart basic training and hands-on experiences to synthesis chemical substances used as drugs and pharmaceuticals. Also, to perform the quality control tests, impurity testing, test for purity and systematic qualitative analysis of chemical substances used as drugs and pharmaceuticals.

Course Objectives: This course will provide the hands-on experience on the following aspects of chemical substances used as drugs and pharmaceuticals

1. Limit tests and assays of selected chemical substances as per the monograph
2. Volumetric analysis of the chemical substances
3. Basics of preparatory chemistry and their analysis
4. Systematic qualitative analysis for the identification of the chemical drugs

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Perform the limit tests for various inorganic elements and report
2. Prepare standard solutions using the principles of volumetric analysis
3. Test the purity of the selected inorganic and organic compounds against the monograph standards
4. Synthesize the selected chemical substances as per the standard synthetic scheme
5. Perform qualitative tests to systematically identify the unknown chemical substances

Practicals

S. No.	Experiment
1	**Limit test for** • Chlorides; sulphate; Iron; heavy metals
2	Identification tests for Anions and Cations as per Indian Pharmacopoeia
3	**Fundamentals of Volumetric analysis** Preparation of standard solution and standardization of Sodium Hydroxide, Potassium Permanganate
4	**Assay of the following compounds** • Ferrous sulphate- by redox titration • Calcium gluconate-by complexometric • Sodium chloride-by Modified Volhard's method • Ascorbic acid by iodometry • Ibuprofen by alkalimetry
5	**Fundamentals of preparative organic chemistry** Determination of Melting point and boiling point of organic compounds
6	**Preparation of organic compounds** • Benzoic acid from Benzamide • Picric acid from Phenol
7	**Identification and test for purity of pharmaceuticals** Aspirin, Caffeine, Paracetamol, Sulfanilamide
8	Systematic Qualitative analysis experiments (4 substances)

Assignments

The students shall be asked to submit the written assignments on the following topics (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

1. Different monographs and formularies available and their major contents
2. Significance of quality control and quality assurance in pharmaceutical industries
3. Overview on Green Chemistry
4. Various software programs available for computer aided drug discovery
5. Various instrumentations used for characterization and quantification of drug

PHARMACOGNOSY – THEORY

Course Code: ER20-13T **75 Hours (3 Hours/week)**

Scope: This course is designed to impart knowledge on the medicinal uses of various drugs of natural origin. Also, the course emphasizes the fundamental concepts in the evaluation of crude drugs, alternative systems of medicine, nutraceuticals, and herbal cosmetics.

Course Objectives: This course will discuss the following aspects of drug substances derived from natural resources.

1. Occurrence, distribution, isolation, identification tests of common phytoconstituents
2. Therapeutic activity and pharmaceutical applications of various natural drug substances and phytoconstituents
3. Biological source, chemical constituents of selected crude drugs and their therapeutic efficacy in common diseases and ailments
4. Basic concepts in quality control of crude drugs and various system of medicines
5. Applications of herbs in health foods and cosmetics

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Identify the important/common crude drugs of natural origin
2. Describe the uses of herbs in nutraceuticals and cosmeceuticals
3. Discuss the principles of alternative system of medicines
4. Describe the importance of quality control of drugs of natural origin

Chapter	Topic	Hours
1	Definition, history, present status and scope of Pharmacognosy	2
2	**Classification of drugs:** • Alphabetical • Taxonomical • Morphological • Pharmacological • Chemical • Chemo-taxonomical	4
3	**Quality control of crude drugs:** • Different methods of adulteration of crude drugs • Evaluation of crude drugs	6

<table>
<tr><td>4</td><td colspan="2">Brief outline of occurrence, distribution, isolation, identification tests, therapeutic activity and pharmaceutical applications of alkaloids, terpenoids, glycosides, volatile oils, tannins and resins.</td><td>6</td></tr>
<tr><td>5</td><td colspan="2">Biological source, chemical constituents and therapeutic efficacy of the following categories of crude drugs.</td><td>30</td></tr>
<tr><td></td><td>Laxatives</td><td>Aloe, Castor oil, Ispaghula, Senna</td><td></td></tr>
<tr><td></td><td>Cardiotonic</td><td>Digitalis, Arjuna</td><td></td></tr>
<tr><td></td><td>Carminatives and G.I. regulators</td><td>Coriander, Fennel, Cardamom, Ginger, Clove, Black Pepper, Asafoetida, Nutmeg, Cinnamon</td><td></td></tr>
<tr><td></td><td>Astringents</td><td>Myrobalan, Black Catechu, Pale Catechu</td><td></td></tr>
<tr><td></td><td>Drugs acting on nervous system</td><td>Hyoscyamus, Belladonna, Ephedra, Opium, Tea leaves, Coffee seeds, Coca</td><td></td></tr>
<tr><td></td><td>Anti-hypertensive</td><td>Rauwolfia</td><td></td></tr>
<tr><td></td><td>Anti-tussive</td><td>Vasaka, Tolu Balsam</td><td></td></tr>
<tr><td></td><td>Anti-rheumatics</td><td>Colchicum seed</td><td></td></tr>
<tr><td></td><td>Anti-tumour</td><td>Vinca, Podophyllum</td><td></td></tr>
<tr><td></td><td>Antidiabetics</td><td>Pterocarpus, Gymnema</td><td></td></tr>
<tr><td></td><td>Diuretics</td><td>Gokhru, Punarnava</td><td></td></tr>
<tr><td></td><td>Anti-dysenteric</td><td>Ipecacuanha</td><td></td></tr>
<tr><td></td><td>Antiseptics and disinfectants</td><td>Benzoin, Myrrh, Neem, Turmeric</td><td></td></tr>
<tr><td></td><td>Antimalarials</td><td>Cinchona, Artemisia</td><td></td></tr>
<tr><td></td><td>Oxytocic</td><td>Ergot</td><td></td></tr>
<tr><td></td><td>Vitamins</td><td>Cod liver oil, Shark liver oil</td><td></td></tr>
<tr><td></td><td>Enzymes</td><td>Papaya, Diastase, Pancreatin, Yeast</td><td></td></tr>
<tr><td></td><td>Pharmaceutical Aids</td><td>Kaolin, Lanolin, Beeswax, Acacia, Tragacanth, Sodium alginate, Agar, Guar gum, Gelatine</td><td></td></tr>
<tr><td></td><td>Miscellaneous</td><td>Squill, Galls, Ashwagandha, Tulsi, Guggul</td><td></td></tr>
<tr><td>6</td><td colspan="2">Plant fibres used as surgical dressings: Cotton, silk, wool and regenerated fibres
Sutures – Surgical Catgut and Ligatures</td><td>3</td></tr>
<tr><td>7</td><td colspan="2">• Basic principles involved in the traditional systems of medicine like: Ayurveda, Siddha, Unani and Homeopathy

• Method of preparation of Ayurvedic formulations like: Arista, Asava, Gutika, Taila, Churna, Lehya and Bhasma</td><td>8</td></tr>
</table>

8	Role of medicinal and aromatic plants in national economy and their export potential	2
9	**Herbs as health food:** Brief introduction and therapeutic applications of: Nutraceuticals, Antioxidants, Pro-biotics, Pre-biotics, Dietary fibres, Omega-3-fatty acids, Spirulina, Carotenoids, Soya and Garlic	4
10	Introduction to herbal formulations	4
11	**Herbal cosmetics:** Sources, chemical constituents, commercial preparations, therapeutic and cosmetic uses of: Aloe vera gel, Almond oil, Lavender oil, Olive oil, Rosemary oil, Sandal Wood oil	4
12	Phytochemical investigation of drugs	2

PHARMACOGNOSY – PRACTICAL

Course Code: ER20-13P **75 Hours (3 Hours/week)**

Scope: This course is designed to train the students in physical identification, morphological characterization, physical and chemical characterization, and evaluation of commonly used herbal drugs.

Course Objectives: This course will provide hands-on experiences to the students in

1. Identification of the crude drugs based on their morphological characteristics
2. Various characteristic anatomical characteristics of the herbal drugs studied through transverse section
3. Physical and chemical tests to evaluate the crude drugs

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Identify the given crude drugs based on the morphological characteristics
2. Take a transverse section of the given crude drugs
3. Describe the anatomical characteristics of the given crude drug under microscopical conditions
4. Carry out the physical and chemical tests to evaluate the given crude drugs

Practicals

1. Morphological Identification of the following drugs:
Ispaghula, Senna, Coriander, Fennel, Cardamom, Ginger, Nutmeg, Black Pepper, Cinnamon, Clove, Ephedra, Rauwolfia, Gokhru, Punarnava, Cinchona, Agar.

2. Gross anatomical studies (Transverse Section) of the following drugs:
Ajwain, Datura, Cinnamon, Cinchona, Coriander, Ashwagandha, Liquorice, Clove, Curcuma, Nux vomica, Vasaka

3. Physical and chemical tests for evaluation of any FIVE of the following drugs:
Asafoetida, Benzoin, Pale catechu, Black catechu, Castor oil, Acacia, Tragacanth, Agar, Guar gum, Gelatine.

Assignments

The students shall be asked to submit the written assignments on the following topics (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

1. Market preparations of various dosage forms of Ayurvedic, Unani, Siddha, Homeopathic (Classical and Proprietary), indications, and their labelling requirements
2. Market preparations of various herbal formulations and herbal cosmetics, indications, and their labelling requirements
3. Herb-Drug interactions documented in the literature and their clinical significances

Field Visit

The students shall be taken in groups to a medicinal garden to witness and understand the nature of various medicinal plants discussed in theory and practical courses. Additionally, they shall be taken in groups to the pharmacies of traditional systems of medicines to understand the availability of various dosage forms and their labelling requirements. Individual reports from each student on their learning experience from the field visit shall be submitted.

HUMAN ANATOMY AND PHYSIOLOGY – THEORY

Course Code: ER20-14T **75 Hours (3 Hours/week)**

Scope: This course is designed to impart basic knowledge on the structure and functions of the human body. It helps in understanding both homeostasis mechanisms and homeostatic imbalances of various systems of the human body.

Course Objectives: This course will discuss the following:

1. Structure and functions of the various organ systems and organs of the human body
2. Homeostatic mechanisms and their imbalances in the human body
3. Various vital physiological parameters of the human body and their significances

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Describe the various organ systems of the human body
2. Discuss the anatomical features of the important human organs and tissues
3. Explain the homeostatic mechanisms regulating the normal physiology in the human system
4. Discuss the significance of various vital physiological parameters of the human body

Chapter	Topic	Hours
1	Scope of Anatomy and Physiology Definition of various terminologies	2
2	**Structure of Cell**: Components and its functions	2
3	**Tissues of the human body**: Epithelial, Connective, Muscular and Nervous tissues – their sub-types and characteristics.	4
4	**Osseous system**: structure and functions of bones of axial and appendicular skeleton Classification, types and movements of joints, disorders of joints	3 3
5	**Haemopoietic system** • Composition and functions of blood • Process of Hemopoiesis • Characteristics and functions of RBCs, WBCs, and platelets • Mechanism of Blood Clotting • Importance of Blood groups	8

6	**Lymphatic system** • Lymph and lymphatic system, composition, function and its formation. • Structure and functions of spleen and lymph node.	3
7	**Cardiovascular system** • Anatomy and Physiology of heart • Blood vessels and circulation (Pulmonary, coronary and systemic circulation) • Cardiac cycle and Heart sounds, Basics of ECG • Blood pressure and its regulation	8
8	**Respiratory system** • Anatomy of respiratory organs and their functions. • Regulation, and Mechanism of respiration. • Respiratory volumes and capacities – definitions	4
9	**Digestive system** • Anatomy and Physiology of the GIT • Anatomy and functions of accessory glands • Physiology of digestion and absorption	8
10	**Skeletal muscles** • Histology • Physiology of muscle contraction • Disorder of skeletal muscles	2
11	**Nervous system** • Classification of nervous system • Anatomy and physiology of cerebrum, cerebellum, mid brain • Function of hypothalamus, medulla oblongata and basal ganglia • Spinal cord-structure and reflexes • Names and functions of cranial nerves. • Anatomy and physiology of sympathetic and parasympathetic nervous system (ANS)	8
12	**Sense organs - Anatomy and physiology of** • Eye • Ear • Skin • Tongue • Nose	6
13	**Urinary system** • Anatomy and physiology of urinary system • Physiology of urine formation • Renin - angiotensin system • Clearance tests and micturition	4

14	**Endocrine system (Hormones and their functions)** • Pituitary gland • Adrenal gland • Thyroid and parathyroid gland • Pancreas and gonads	6
15	**Reproductive system** • Anatomy of male and female reproductive system • Physiology of menstruation • Spermatogenesis and Oogenesis • Pregnancy and parturition	4

HUMAN ANATOMY AND PHYSIOLOGY – PRACTICAL

Course Code: ER20-14P **75 Hours (3 Hours/week)**

Scope: This course is designed to train the students and instil the skills for carrying out basic physiological monitoring of various systems and functions.

Course Objectives: This course will provide hands-on experience in the following:

1. General blood collection techniques and carrying out various haematological assessments and interpreting the results
2. Recording and monitoring the vital physiological parameters in human subjects and the basic interpretations of the results
3. Microscopic examinations of the various tissues permanently mounted in glass slides
4. Discuss the anatomical and physiological characteristics of various organ systems of the body using models, charts, and other teaching aids

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Perform the haematological tests in human subjects and interpret the results
2. Record, monitor and document the vital physiological parameters of human subjects and interpret the results
3. Describe the anatomical features of the important human tissues under the microscopical conditions
4. Discuss the significance of various anatomical and physiological characteristics of the human body

Practicals

1. Study of compound microscope
2. General techniques for the collection of blood
3. Microscopic examination of Epithelial tissue, Cardiac muscle, Smooth muscle, Skeletal muscle, Connective tissue, and Nervous tissue of ready / pre-prepared slides.
4. Study of Human Skeleton-Axial skeleton and appendicular skeleton
5. Determination of
    a. Blood group
    b. ESR
    c. Haemoglobin content of blood
    d. Bleeding time and Clotting time
6. Determination of WBC count of blood
7. Determination of RBC count of blood
8. Determination of Differential count of blood
9. Recording of Blood Pressure in various postures, different arms, before and after exertion and interpreting the results
10. Recording of Body temperature (using mercury, digital and IR thermometers at various locations), Pulse rate/ Heart rate (at various locations in the body, before and after exertion), Respiratory Rate
11. Recording Pulse Oxygen (before and after exertion)
12. Recording force of air expelled using Peak Flow Meter
13. Measurement of height, weight, and BMI
14. Study of various systems and organs with the help of chart, models, and specimens
    a) Cardiovascular system
    b) Respiratory system
    c) Digestive system
    d) Urinary system
    e) Endocrine system
    f) Reproductive system
    g) Nervous system
    h) Eye
    i) Ear
    j) Skin

SOCIAL PHARMACY – THEORY

Course Code: ER20-15T **75 Hours (3 Hours/week)**

Scope: This course is designed to impart basic knowledge on public health, epidemiology, preventive care, and other social health related concepts. Also, to emphasize the roles of pharmacists in the public health programs.

Course Objectives: This course will discuss about basic concepts of

1. Public health and national health programs
2. Preventive healthcare
3. Food and nutrition related health issues
4. Health education and health promotion
5. General roles and responsibilities of pharmacists in public health

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Discuss about roles of pharmacists in the various national health programs
2. Describe various sources of health hazards and disease preventive measures
3. Discuss the healthcare issues associated with food and nutritional substances
4. Describe the general roles and responsibilities of pharmacists in public health

Chapter	Topic	Hours
1	**Introduction to Social Pharmacy** • Definition and Scope. Social Pharmacy as a discipline and its scope in improving the public health. Role of Pharmacists in Public Health. (2) • Concept of Health -WHO Definition, various dimensions, determinants, and health indicators. (3) • National Health Policy – Indian perspective (1) • Public and Private Health System in India, National Health Mission (2) • Introduction to Millennium Development Goals, Sustainable Development Goals, FIP Development Goals (1)	9
2	**Preventive healthcare – Role of Pharmacists in the following** • Demography and Family Planning (3) • Mother and child health, importance of breastfeeding, ill effects of infant milk substitutes and bottle feeding (2) • Overview of Vaccines, types of immunity and immunization (4)	18

	• Effect of Environment on Health – Water pollution, importance of safe drinking water, waterborne diseases, air pollution, noise pollution, sewage and solid waste disposal, occupational illnesses, Environmental pollution due to pharmaceuticals (7) • Psychosocial Pharmacy: Drugs of misuse and abuse – psychotropics, narcotics, alcohol, tobacco products. Social Impact of these habits on social health and productivity and suicidal behaviours (2)	
3	**Nutrition and Health** • Basics of nutrition – Macronutrients and Micronutrients (3) • Importance of water and fibres in diet (1) • Balanced diet, Malnutrition, nutrition deficiency diseases, ill effects of junk foods, calorific and nutritive values of various foods, fortification of food (3) • Introduction to food safety, adulteration of foods, effects of artificial ripening, use of pesticides, genetically modified foods (1) • Dietary supplements, nutraceuticals, food supplements – indications, benefits, Drug-Food Interactions (2)	**10**
4	Introduction to Microbiology and common microorganisms (3) **Epidemiology:** Introduction to epidemiology, and its applications. Understanding of terms such as epidemic, pandemic, endemic, mode of transmission, outbreak, quarantine, isolation, incubation period, contact tracing, morbidity, mortality, . (2) Causative agents, epidemiology and clinical presentations and Role of Pharmacists in educating the public in prevention of the following communicable diseases: • Respiratory infections – chickenpox, measles, rubella, mumps, influenza (including Avian-Flu, H1N1, SARS, MERS, COVID-19), diphtheria, whooping cough, meningococcal meningitis, acute respiratory infections, tuberculosis, Ebola (7) • Intestinal infections – poliomyelitis, viral hepatitis, cholera, acute diarrheal diseases, typhoid, amebiasis, worm infestations, food poisoning (7)	**28**

	• Arthropod-borne infections - dengue, malaria, filariasis and, chikungunya (4) • Surface infections – trachoma, tetanus, leprosy (2) • STDs, HIV/AIDS (3)	
5	Introduction to health systems and **all ongoing National Health programs** in India, their objectives, functioning, outcome, and the role of pharmacists.	8
6	**Pharmacoeconomics** – Introduction, basic terminologies, importance of pharmacoeconomics	2

SOCIAL PHARMACY – PRACTICAL

Course Code: ER20-15P **75 Hours (3 Hours/week)**

Scope: This course is designed to provide simulated experience in various public health and social pharmacy activities.

Course Objectives: This course will train the students on various roles of pharmacists in public health and social pharmacy activities in the following areas:

1. National immunization programs
2. Reproductive and child health programs
3. Food and nutrition related health programs
4. Health education and promotion
5. General roles and responsibilities of the pharmacists in public health
6. First Aid for various emergency conditions including basic life support and cardiopulmonary resuscitation

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Describe the roles and responsibilities of pharmacists in various National health programs
2. Design promotional materials for public health awareness
3. Describe various health hazards including microbial sources
4. Advice on preventive measures for various diseases
5. Provide first aid for various emergency conditions

Note: Demonstration / Hands-on experience / preparation of charts / models / promotional materials / role plays / enacting / e-brochures / e-flyers / podcasts / video podcasts / any other innovative activities to understand the concept of various elements of social pharmacy listed here. (At least one activity to be carried out for each one of the following):

Practicals

1. National immunization schedule for children, adult vaccine schedule, Vaccines which are not included in the National Immunization Program.
2. RCH – reproductive and child health – nutritional aspects, relevant national health programmes.
3. Family planning devices
4. Microscopical observation of different microbes (readymade slides)
5. Oral Health and Hygiene
6. Personal hygiene and etiquettes – hand washing techniques, Cough and sneeze etiquettes.
7. Various types of masks, PPE gear, wearing/using them, and disposal.
8. Menstrual hygiene, products used
9. First Aid – Theory, basics, demonstration, hands on training, audio-visuals, and practice, BSL (Basic Life Support) Systems [SCA - Sudden Cardiac Arrest, FBAO - Foreign Body Airway Obstruction, CPR, Defibrillation (using AED) (Includes CPR techniques, First Responder).
10. Emergency treatment for all medical emergency cases viz. snake bite, dog bite, insecticide poisoning, fractures, burns, epilepsy etc.
11. Role of Pharmacist in Disaster Management.
12. Marketed preparations of disinfectants, antiseptics, fumigating agents, antilarval agents, mosquito repellents, etc.
13. Health Communication: Audio / Video podcasts, Images, Power Point Slides, Short Films, etc. in regional language(s) for mass communication / education / Awareness on 5 different communicable diseases, their signs and symptoms, and prevention.
14. Water purification techniques, use of water testing kit, calculation of Content/percentage of $KMnO_4$, bleaching powder to be used for wells/tanks
15. Counselling children on junk foods, balanced diets – using Information, Education and Communication (IEC), counselling, etc. (Simulation Experiments).
16. Preparation of various charts on nutrition, sources of various nutrients from Locally available foods, calculation of caloric needs of different groups (e.g. child, mother, sedentary lifestyle, etc.). Chart of glycemic index of foods.
17. Tobacco cessation, counselling, identifying various tobacco containing products through charts/pictures

Assignment

The students shall be asked to submit the written assignments on the following topics (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

1. An overview of Women's Health Issues
2. Study the labels of various packed foods to understand their nutritional contents
3. Breastfeeding counselling, guidance – using Information, Education and Communication (IEC)
4. Information about the organizations working on de-addiction services in the region (city / district, etc.)
5. Role of a pharmacist in disaster management – A case study
6. Overview on the National Tuberculosis Elimination Programme (NTEP)
7. Drug disposal systems in the country, at industry level and citizen level
8. Various Prebiotics or Probiotics (dietary and market products)
9. Emergency preparedness: Study of local Government structure with respect to Fire, Police departments, health department
10. Prepare poster/presentation for general public on any one of the Health Days. e.g. Day, AIDS Day, Handwashing Day,_ORS day, World Diabetes Day, World Heart Day, etc.
11. List of home medicines, their storage, safe handling, and disposal of unused medicines
12. Responsible Use of Medicines: From Purchase to Disposal
13. Collection of newspaper clips (minimum 5) relevant to any one topic and its submission in an organized form with collective summary based on the news items
14. Read a minimum of one article relevant to any theory topic, from Pharma /Science/ or other Periodicals and prepare summary of it for submission
15. Potential roles of pharmacists in rural India

Field Visits

The students shall be taken in groups to visit any THREE of the following facilities to witness and understand the activities of such centres/facilities from the perspectives of the topics discussed in theory and/or practical courses. Individual reports from each student on their learning experience from the field visits shall be submitted.

1. Garbage Treatment Plant
2. Sewage Treatment Plant
3. Bio-medical Waste Treatment Plant
4. Effluent Treatment Plant
5. Water purification plant
6. Orphanage / Elderly-Care-Home / School and or Hostel/Home for persons with disabilities
7. Primary health care centre

8. ER-2020 D.Pharm Syllabus – Part II

S. No.	Course Code	Name of the Course	Total Theory / Practical Hours	Total Tutorial Hours	Theory / Practical Hours per Week	Tutorial Hours per Week
1.	ER20-21T	Pharmacology – Theory	75	25	3	1
2.	ER20-21P	Pharmacology – Practical	50	-	2	-
3.	ER20-22T	Community Pharmacy & Management – Theory	75	25	3	1
4.	ER20-22P	Community Pharmacy & Management – Practical	75	-	3	-
5.	ER20-23T	Biochemistry & Clinical Pathology – Theory	75	25	3	1
6.	ER20-23P	Biochemistry & Clinical Pathology – Practical	50	-	2	-
7.	ER20-24T	Pharmacotherapeutics – Theory	75	25	3	1
8.	ER20-24P	Pharmacotherapeutics – Practical	25	-	1	-
9.	ER20-25T	Hospital & Clinical Pharmacy – Theory	75	25	3	1
10.	ER20-25P	Hospital & Clinical Pharmacy – Practical	25	-	1	-
11.	ER20-26T	Pharmacy Law & Ethics	75	25	3	1

PHARMACOLOGY – THEORY

Course Code: ER20-21T **75 Hours (3 Hours/week)**

Scope: This course provides basic knowledge about different classes of drugs available for the pharmacotherapy of common diseases. The indications for use, dosage regimen, routes of administration, pharmacokinetics, pharmacodynamics, and contraindications of the drugs discussed in this course are vital for successful professional practice.

Course Objectives: This course will discuss the following:

1. General concepts of pharmacology including pharmacokinetics, pharmacodynamics, routes of administration, etc.
2. Pharmacological classification and indications of drugs
3. Dosage regimen, mechanisms of action, contraindications of drugs
4. Common adverse effects of drugs

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Describe the basic concepts of pharmacokinetics and pharmacodynamics2. Enlist the various classes and drugs of choices for any given disease condition
3. Advice the dosage regimen, route of administration and contraindications for a given drug
4. Describe the common adverse drug reactions

Chapter	Topic	Hours
1	**General Pharmacology** • Introduction and scope of Pharmacology • Various routes of drug administration - advantages and disadvantages • Drug absorption - definition, types, factors affecting drug absorption • Bioavailability and the factors affecting bioavailability • Drug distribution - definition, factors affecting drug distribution • Biotransformation of drugs - Definition, types of biotransformation reactions, factors influencing drug metabolisms • Excretion of drugs - Definition, routes of drug excretion • General mechanisms of drug action and factors modifying drug action	10

2	**Drugs Acting on the Peripheral Nervous System** • Steps involved in neurohumoral transmission • Definition, classification, pharmacological actions, dose, indications, and contraindications of a) Cholinergic drugs b) Anti-Cholinergic drugs c) Adrenergic drugs d) Anti-adrenergic drugs e) Neuromuscular blocking agents f) Drugs used in Myasthenia gravis g) Local anaesthetic agents h) Non-Steroidal Anti-Inflammatory drugs (NSAIDs)	11
3	**Drugs Acting on the Eye** Definition, classification, pharmacological actions, dose, indications and contraindications of • Miotics • Mydriatics • Drugs used in Glaucoma	2
4	**Drugs Acting on the Central Nervous System** Definition, classification, pharmacological actions, dose, indications, and contraindications of • General anaesthetics • Hypnotics and sedatives • Anti-Convulsant drugs • Anti-anxiety drugs • Anti-depressant drugs • Anti-psychotics • Nootropic agents • Centrally acting muscle relaxants • Opioid analgesics	8
5	**Drugs Acting on the Cardiovascular System** Definition, classification, pharmacological actions, dose, indications, and contraindications of • Anti-hypertensive drugs • Anti-anginal drugs • Anti-arrhythmic drugs • Drugs used in atherosclerosis and • Congestive heart failure • Drug therapy for shock	6

6	**Drugs Acting on Blood and Blood Forming Organs** Definition, classification, pharmacological actions, dose, indications, and contraindications of • Hematinic agents • Anti-coagulants • Anti-platelet agents • Thrombolytic drugs	4
7	Definition, classification, pharmacological actions, dose, indications, and contraindications of • Bronchodilators • Expectorants • Anti-tussive agents • Mucolytic agents	2
8	**Drugs Acting on the Gastro Intestinal Tract** Definition, classification, pharmacological actions, dose, indications, and contraindications of • Anti-ulcer drugs • Anti-emetics • Laxatives and purgatives • Anti-diarrheal drugs	5
9	**Drugs Acting on the Kidney** Definition, classification, pharmacological actions, dose, indications, and contraindications of • Diuretics • Anti-Diuretics	2
10	**Hormones and Hormone Antagonists** Physiological and pathological role and clinical uses of • Thyroid hormones • Anti-thyroid drugs • Parathormone • Calcitonin • Vitamin D • Insulin • Oral hypoglycemic agents • Estrogen • Progesterone • Oxytocin • Corticosteroids	8

11	**Autocoids** • Physiological role of Histamine, 5 HT and Prostaglandins • Classification, clinical uses, and adverse effects of antihistamines and 5 HT antagonists	3
12	**Chemotherapeutic Agents:** Introduction, basic principles of chemotherapy of infections, infestations and neoplastic diseases, Classification, dose, indication and contraindications of drugs belonging to following classes: • Penicillins • Cephalosporins • Aminoglycosides • Fluoroquinolones • Macrolides • Tetracyclines • Sulphonamides • Anti-tubercular drugs • Anti-fungal drugs • Anti-viral drugs • Anti-amoebic agents • Anthelmintics • Anti-malarial agents • Anti-neoplastic agents	12
13	**Biologicals** Definition, types, and indications of biological agents with examples	2

PHARMACOLOGY – PRACTICAL

Course Code: ER20-21P **50 Hours (2 Hours/week)**

Scope: This course provides the basic understanding about the uses, mechanisms of actions, dose dependent responses of drugs in simulated virtual animal models and experimental conditions.

Course Objectives: This course will demonstrate / provide hands-on experience in the virtual platform using appropriate software on the following

1. Study of pharmacological effects of drugs like local anaesthetics, mydriatic and mitotic on rabbit eye
2. Screening the effects of various drugs acting in the central nervous system
3. Study of drug effects on isolated organs / tissues
4. Study of pyrogen testing on rabbit

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Study and report the local anaesthetic, mydriatic and mitotic effects of the given drug on the rabbit eye
2. Choose appropriate animal experiment model to study the effects of the given drugs acting on the central nervous system and submit the report
3. Perform the effects of given tissues (simulated) on isolated organs / tissues and interpret the results
4. Interpret the dose dependent responses of drugs in various animal experiment models

Practicals

Introduction to the following topics pertaining to the experimental pharmacology have to be discussed and documented in the practical manuals.

1. Introduction to experimental pharmacology
2. Study of laboratory animals
   (a) Mice; (b) Rats; (c) Guinea pigs; (d) Rabbits
3. Commonly used instruments in experimental pharmacology
4. Different routes of administration of drugs in animals
5. Types of pre-clinical experiments: In-Vivo, In-Vitro, Ex-Vivo, etc.
6. Techniques of blood collection from animals

Experiments

Note: Animals shall not be used for doing / demonstrating any of the experiments given. The given experiments shall be carried- out / demonstrated as the case may be, ONLY with the use of software program(s) such as 'Ex Pharm' or any other suitable software

1. Study of local anaesthetics on rabbit eye
2. Study of Mydriatic effect on rabbit eye
3. Study of Miotic effect on rabbit eye
4. Effect of analgesics using Analgesiometer
5. Study of analgesic activity by writhing test
6. Screening of anti-convulsant using Electro Convulsiometer
7. Screening of Muscle relaxants using Rota-Rod apparatus
8. Screening of CNS stimulants and depressants using Actophotometer
9. Study of anxiolytic activity using elevated plus maze method
10. Study of effect of drugs (any 2) on isolated heart
11. Effect of drugs on ciliary motility on frog's buccal cavity
12. Pyrogen testing by rabbit method

Assignments

The students shall be asked to submit written assignments on the following topics (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

1. Introduction to Allergy Testing
2. Introduction to Toxicity Studies
3. Drug Facts Labels of US FDA
4. Pre-clinical studies in new drug development
5. Medicines and meals: Before or After food
6. Pre-clinical studies in new drug development
7. Drugs available as paediatric formulations
8. Drug information apps

COMMUNITY PHARMACY AND MANAGEMENT – THEORY

Course Code: ER20-22T **75 Hours (3 Hours/week)**

Scope: The course is designed to impart basic knowledge and skills to provide various pharmaceutical care services to patients and general practitioners in the community setup.

Course Objectives: This course will discuss the following:

1. Establishing and running a community pharmacy and its legal requirements
2. Professional aspects of handling and filling prescriptions
3. Patient counselling on diseases, prescription and or non-prescription medicines
4. Scope for performing basic health screening in community pharmacy settings

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Describe the establishment, legal requirements, and effective administration of a community pharmacy
2. Professionally handle prescriptions and dispense medications
3. Counsel patients about the disease, prescription and or non-prescription medicines
4. Perform basic health screening on patients and interpret the reports in the community pharmacy settings

Chapter	Topic	Hours
1	**Community Pharmacy Practice** – Definition, history and development of community pharmacy - International and Indian scenarios	2
2	Professional responsibilities of community pharmacists Introduction to the concept of Good Pharmacy Practice and SOPs.	3
3	**Prescription and prescription handling** • Definition, parts of prescriptions, legality of prescriptions, prescription handling, labelling of dispensed medications (Main label, ancillary label, pictograms), brief instructions on medication usage • Dispensing process, Good Dispensing Practices, dispensing errors and strategies to minimize them	7

4	**Communication skills** • Definition, types of communication skills • Interactions with professionals and patients • Verbal communication skills (one-to-one, over the telephone) • Written communication skills • Body language • Patient interview techniques	6
5	**Patient counselling** • Definition and benefits of patient counselling • **Stages of patient counselling** - Introduction, counselling content, counselling process, and closing the counselling session • **Barriers to effective counseling** - Types and strategies to overcome the barriers • **Patient counselling points for chronic diseases/disorders** - Hypertension, Diabetes, Asthma, Tuberculosis, Chronic obstructive pulmonary disease, and AIDS • **Patient Package Inserts** - Definition, importance and benefits, Scenarios of PPI use in India and other countries • **Patient Information leaflets** - Definition and uses	10
6	**Medication Adherence** Definition, factors influencing non-adherence, strategies to overcome non-adherence	2
7	**Health Screening Services in Community Pharmacy** Introduction, scope, and importance of various health screening services - for routine monitoring of patients, early detection, and referral of undiagnosed cases	5
9	**Over The Counter (OTC) Medications** • Definition, need and role of Pharmacists in OTC medication dispensing • OTC medications in India, counseling for OTC products • Self-medication and role of pharmacists in promoting the safe practices during self-medication • Responding to symptoms, minor ailments, and advice for self-care in conditions such as - Pain management, Cough, Cold, Diarrhea, Constipation, Vomiting, Fever, Sore throat, Skin disorders, Oral health (mouth ulcers, dental pain, gum swelling)	15

10	**Community Pharmacy Management** • Legal requirements to set up a community pharmacy • Site selection requirements • Pharmacy designs and interiors • Vendor selection and ordering • Procurement, inventory control methods, and inventory management • Financial planning and management • Accountancy in community pharmacy – Day book, Cash book • Introduction to pharmacy operation softwares – usefulness and availability • Customer Relation Management (CRM) • Audits in Pharmacies • SOP of Pharmacy Management • Introduction to Digital Health, mHealth and Online pharmacies	25

COMMUNITY PHARMACY AND MANAGEMENT – PRACTICAL

Course Code: ER20-22P **75 Hours (3 Hours/week)**

Scope: The course is designed to train the students and improve professional skills to provide various pharmaceuticalcare services in community pharmacy.

Course Objectives: This course will train the students in the following

1. Professional handling and filling prescriptions
2. Patient counselling on diseases and minor ailments
3. Patient counselling on prescription and / or non-prescription medicines
4. Preparation of counselling materials such as patient information leaflets
5. Performing basic health screening tests

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Handle and fill prescriptions in a professional manner
2. Counsel patients on various diseases and minor ailments
3. Counsel patients on prescription and or non-prescription medicines
4. Design and prepare patient information leaflets
5. Perform basic health screening tests

Practicals

Note: The following practicals shall be carried out in the model community pharmacy with appropriate simulated scenarios and materials. Students shall be trained through role plays wherever necessary. The activities of the students shall be assessed / evaluated using a structured objective assessment form.

1. Handling of prescriptions with professional standards, reviewing prescriptions, checking for legal compliance and completeness (minimum 5)
2. Identification of drug-drug interactions in the prescription and follow-up actions (minimum 2)
3. Preparation of dispensing labels and auxiliary labels for the prescribed medications (minimum 5)
4. Providing the following health screening services for monitoring patients / detecting new patients (one experiment for each activity)

   Blood Pressure Recording, Capillary Blood Glucose Monitoring, Lung function assessment using Peak Flow Meter and incentive spirometer, recording capillary oxygen level using Pulse Oximeter, BMI measurement
5. Providing counselling to simulated patients for the following chronic diseases / disorders including education on the use of devices such as insulin pen, inhalers, spacers, nebulizers, etc. where appropriate (one experiment for each disease)

   Type 2 Diabetes Mellitus, Primary Hypertension, Asthma, Hyperlipidaemia, Rheumatoid Arthritis
6. Providing counselling to simulated patients for the following minor ailments (any three)

   Headache, GI disturbances (Nausea, Vomiting, Dyspepsia, diarrhoea, constipation), Worm infestations, Pyrexia, Upper Respiratory Tract infections, Skin infections, Oral and dental disorders.
7. Appropriate handling of dummy dosage forms with correct administration techniques - oral liquids with measuring cup/cap/dropper, Eye Drops, Inhalers, Nasal drops, Insulin pen, nebulizers, different types of tablets, patches, enemas, suppositories
8. Use of Community Pharmacy Software and digital health tools

Assignments

The students shall be asked to submit written assignments on the following topics (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

1. SOPs for various activities in Community Pharmacy (as discussed in Theory and Practical)

2. List out the various abbreviations, short forms used in prescriptions and their interpretation
3. Patient Information Leaflet for a given chronic disease / disorder
4. Patient Information Leaflet for prescription / non-prescription medicines
5. Preparation of window / shelf display materials for the model community pharmacy
6. Overview of Software available for retail pharmacy management including billing, inventory, etc.
7. Dosage / Medication Reminder Aids
8. Overview on the operations and marketing strategies of various online pharmacies
9. Overview on the common fixed dose combinations
10. Overview on the medications requiring special storage conditions
11. Role of Community Pharmacists in preventing Antimicrobial Resistance
12. Jan Aushadhi and other Generic Medicine initiatives in India
13. Global Overview of Online Pharmacies
14. Community Pharmacy Practice Standards: Global Vs. Indian Scenario
15. Overview of pharmacy associations in India

Field Visit

The students shall be taken in groups to visit community pharmacies and medicine distributors to understand and witness the professional activities of the community pharmacists, and supply chain logistics. Individual reports from each student on their learning experience from the field visit shall be submitted.

BIOCHEMISTRY & CLINICAL PATHOLOGY – THEORY

Course Code: ER20-23T **75 Hours (3 Hours/week)**

Scope: This course is designed to impart basic knowledge on the study of structure and functions of biomolecules and the chemical processes associated with living cells in normal and abnormal states. The course also emphasizes on the clinical pathology of blood and urine.

Course Objectives: This course will discuss the following at the fundamental level

1. Structure and functions of biomolecules
2. Catalytic activity, diagnostic and therapeutic importance of enzymes
3. Metabolic pathways of biomolecules in health and illness (metabolic disorders)
4. Biochemical principles of organ function tests and their clinical significance
5. Qualitative and quantitative determination of biomolecules / metabolites in the biological sample
6. Clinical pathology of blood and urine

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Describe the functions of biomolecules
2. Discuss the various functions of enzymes in the human system
3. Explain the metabolic pathways of biomolecules in both physiological and pathological conditions
4. Describe the principles of organ function tests and their clinical significances
5. Determine the biomolecules / metabolites in the given biological samples, both qualitatively and quantitatively
6. Describe the clinical pathology of blood and urine

Chapter	Topic	Hours
1	**Introduction to biochemistry**: Scope of biochemistry in pharmacy; Cell and its biochemical organization.	2
2	**Carbohydrates** • Definition, classification with examples, chemical properties • Monosaccharides - Structure of glucose, fructose, and galactose • Disaccharides - structure of maltose, lactose, and sucrose • Polysaccharides - chemical nature of starch and glycogen • Qualitative tests and biological role of carbohydrates	5

3	**Proteins** • Definition, classification of proteins based on composition and solubility with examples • Definition, classification of amino acids based on chemical nature and nutritional requirements with examples • Structure of proteins (four levels of organization of protein structure) • Qualitative tests and biological role of proteins and amino acids • Diseases related to malnutrition of proteins.	5
4	**Lipids** • Definition, classification with examples • Structure and properties of triglycerides (oils and fats) • Fatty acid classification - Based on chemical and nutritional requirements with examples • Structure and functions of cholesterol in the body • Lipoproteins - types, composition and functions in the body • Qualitative tests and functions of lipids	5
5	**Nucleic acids** • Definition, purine and pyrimidine bases • Components of nucleosides and nucleotides with examples • Structure of DNA (Watson and Crick model), RNA and their functions	4
6	**Enzymes** • Definition, properties and IUB and MB classification • Factors affecting enzyme activity • Mechanism of action of enzymes, Enzyme inhibitors • Therapeutic and pharmaceutical importance of enzymes	5
7	**Vitamins** • Definition and classification with examples • Sources, chemical nature, functions, coenzyme form, recommended dietary requirements, deficiency diseases of fat-and water-soluble vitamins	6
8	**Metabolism** (Study of cycle/pathways without chemical structures) • Metabolism of Carbohydrates: Glycolysis, TCA cycle and glycogen metabolism, regulation of blood glucose	20

	level. Diseases related to abnormal metabolism of Carbohydrates • Metabolism of lipids: Lipolysis, β-oxidation of Fatty acid (Palmitic acid) ketogenesis and ketolysis. Diseases related to abnormal metabolism of lipids such as Ketoacidosis, Fatty liver, Hypercholesterolemia • Metabolism of Amino acids (Proteins): General reactions of amino acids and its significance– Transamination, deamination, Urea cycle and decarboxylation. Diseases related to abnormal metabolism of amino acids, Disorders of ammonia metabolism, phenylketonuria, alkaptonuria and Jaundice. • Biological oxidation: Electron transport chain and Oxidative phosphorylation	
9	**Minerals**: Types, Functions, Deficiency diseases, recommended dietary requirements	**05**
10	**Water and Electrolytes** • Distribution, functions of water in the body • Water turnover and balance • Electrolyte composition of the body fluids, Dietary intake of electrolyte and Electrolyte balance • Dehydration, causes of dehydration and oral rehydration therapy	**05**
11	Introduction to Biotechnology	**01**
12	**Organ function tests** • Functions of kidney and routinely performed tests to assess the functions of kidney and their clinical significances • Functions of liver and routinely performed tests to assess the functions of liver and their clinical significances • Lipid profile tests and its clinical significances	**06**
13	**Introduction to Pathology of Blood and Urine** • Lymphocytes and Platelets, their role in health and disease • Erythrocytes - Abnormal cells and their significance • Normal and Abnormal constituents of Urine and their significance	**06**

BIOCHEMISTRY & CLINICAL PATHOLOGY – PRACTICAL

Course Code: ER20-23P **50 Hours (2 Hours/week)**

Scope: This course is designed to train the students in the qualitative testing of various biomolecules and testing of biological samples for determination of normal and abnormal constituents

Course Objectives: This course will train and provide hands-on experiences on the following

1. Qualitative determination of biomolecules / metabolites in simulated biological samples
2. Determination of normal and abnormal constituents of simulated blood and urine samples

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Qualitatively determine the biomolecules / metabolites in the given biological samples
2. Determine the normal and abnormal constituents in blood and urine samples and interpret the results of such testing

Practicals

1. Qualitative analysis of carbohydrates (4 experiments)
2. Qualitative analysis of Proteins and amino acids (4 experiments)
3. Qualitative analysis of lipids (2 experiments)
4. Qualitative analysis of urine for normal and abnormal constituents (4 experiments)
5. Determination of constituents of urine (glucose, creatinine, chlorides) (2 experiments)
6. Determination of constituents of blood/serum (simulated) (Creatine, glucose, cholesterol, Calcium, Urea, SGOT/SGPT) (5 experiments)
7. Study the hydrolysis of starch from acid and salivary amylase enzyme (1 experiment)

Assignments

The students shall be asked to submit written assignments on Various Pathology Lab Reports (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

PHARMACOTHERAPEUTICS - THEORY

Course Code: ER20-24T **75 Hours (3 Hours/week)**

Scope: This course is designed to impart basic knowledge on etiopathogenesis of common diseases and their management along with quality use of medicines.

Course Objectives: This course will discuss about

1. Etiopathogenesis of selected common diseases and evidence-based medicine therapy
2. Importance of individualized therapeutic plans based on diagnosis
3. Basic methods for assessing the clinical outcomes of drug therapy

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Help assessing the subjective and objective parameters of patients in common disease conditions
2. Assist other healthcare providers to analyse drug related problems and provide therapeutic interventions
3. Participate in planning the rational medicine therapy for common diseases
4. Design and deliver discharge counselling for patients

Chapter	Topic	Hours
1	Pharmacotherapeutics – Introduction, scope, and objectives. Rational use of Medicines, Evidence Based Medicine, Essential Medicines List, Standard Treatment Guidelines (STGs)	8
2	**Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of the diseases associated with**	
	(a) Cardiovascular System • Hypertension • Angina and Myocardial infarction • Hyperlipidaemia • Congestive Heart Failure	8
	(b) Respiratory System • Asthma • COPD	4
	(c) Endocrine System • Diabetes • Thyroid disorders - Hypo and Hyperthyroidism	5
	(d) Central Nervous System • Epilepsy	8

	• Parkinson's disease • Alzheimer's disease • Stroke • Migraine	
	(e) Gastro Intestinal Disorders • Gastro oesophageal reflux disease • Peptic Ulcer Disease • Alcoholic liver disease • Inflammatory Bowel Diseases (Crohn's Disease and Ulcerative Colitis)	8
	(f) Haematological disorders • Iron deficiency anaemia • Megaloblastic anaemia	4
	(g) Infectious diseases • Tuberculosis • Pneumonia • Urinary tract infections • Hepatitis • Gonorrhoea and Syphilis • Malaria • HIV and Opportunistic infections • Viral Infections (SARS, CoV2)	12
	(h) Musculoskeletal disorders • Rheumatoid arthritis • Osteoarthritis	3
	(i) Dermatology • Psoriasis • Scabies • Eczema	3
	(j) Psychiatric Disorders • Depression • Anxiety • Psychosis	4
	(k) Ophthalmology • Conjunctivitis (bacterial and viral) • Glaucoma	2
	(l) Anti-microbial Resistance	2
	(m) Women's Health • Polycystic Ovary Syndrome • Dysmenorrhea • Premenstrual Syndrome	4

PHARMACOTHERAPEUTICS – PRACTICAL

Course Code: ER20-24P **25 Hours (1 Hour/week)**

Scope: This course is designed to train the students in the basic skills required to support the pharmaceutical care services for selected common disease conditions.

Course Objectives: This course will train the students on

1. How to prepare a SOAP (Subjective, Objective, Assessment and Plan) note for clinical cases of selected common diseases
2. Patient counselling techniques/methods for common disease conditions

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Write SOAP (Subjective, Objective, Assessment and Plan) notes for the given clinical cases of selected common diseases
2. Counsel the patients about the disease conditions, uses of drugs, methods of handling and administration of drugs, life-style modifications, and monitoring parameters.

Practicals

I. Preparation and discussion of SOAP (Subjective, Objective, Assessment and Plan) notes for at least SIX clinical cases (real / hypothetical) of the following disease conditions.

1. Hypertension
2. Angina Pectoris
3. Myocardial Infarction
4. Hyperlipidaemia
5. Rheumatoid arthritis
6. Asthma
7. COPD
8. Diabetes
9. Epilepsy
10. Stroke
11. Depression
12. Tuberculosis
13. Anaemia (any one type as covered in theory)
14. Viral infection (any one type as covered in theory)
15. Dermatological conditions (any one condition as covered in theory)

II. Patient counselling exercises using role plays based on the real / hypothetical clinical case scenarios. The students are expected to provide counselling on disease condition, medications, life-style modifications, monitoring parameters, etc. and the same shall be documented. (Minimum 5 cases)

III. Simulated cases to enable dose calculation of selected drugs in paediatrics, and geriatrics under various pathological conditions. (Minimum 4 cases)

HOSPITAL AND CLINICAL PHARMACY – THEORY

Course Code: ER20-25T **75 Hours (3 Hours/week)**

Scope: This course is designed to impart fundamental knowledge and professional skills required for facilitating various hospital and clinical pharmacy services.

Course Objectives: This course will discuss and train the students in the following

1. Hospital and Hospital Pharmacy organization and set-ups
2. Basics of hospital pharmacy services including the procurement, supply chain, storage of medicines and medical supplies
3. Basics of clinical pharmacy including introduction to comprehensive pharmaceutical care services
4. Basic interpretations of common laboratory results used in clinical diagnosis towards optimizing the drug therapy

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Explain about the basic concepts of hospital pharmacy administration
2. Manage the supply chain and distribution of medicines within the hospital settings
3. Assist the other healthcare providers in monitoring drug therapy and address drug related problems
4. Interpret common lab investigation reports for optimizing drug therapy

S. No.	Topic	Hours
1	**Hospital Pharmacy** • Definition, scope, national and international scenario • Organisational structure • Professional responsibilities, Qualification and experience requirements, job specifications, work–load requirements and inter professional relationships • Good Pharmacy Practice (GPP) in hospital • Hospital Pharmacy Standards (FIP Basel Statements, AHSP) • Introduction to NAQS guidelines and NABH Accreditation and Role of Pharmacists	6
2	**Different Committees in the Hospital** • Pharmacy and Therapeutics Committee - Objectives, Composition, and functions • Hospital Formulary - Definition, procedure for development and use of hospital formulary	4

	• Infection Control Committee – Role of Pharmacist in preventing Antimicrobial Resistance	
4	**Supply Chain and Inventory Control** • Preparation of Drug lists - High Risk drugs, Emergency drugs, Schedule H1 drugs, NDPS drugs, reserved antibiotics • Procedures of Drug Purchases – Drug selection, short term, long term, and tender/e-tender process, quotations, etc. • Inventory control techniques: Economic Order Quantity, Reorder Quantity Level, Inventory Turnover etc. • Inventory Management of Central Drug Store – Storage conditions, Methods of storage, Distribution, Maintaining Cold Chain, Devices used for cold storage (Refrigerator, ILR, Walk-in-Cold rooms) • FEFO, FIFO methods • Expiry drug removal and handling, and disposal. Disposal of Narcotics, cytotoxic drugs • Documentation - purchase and inventory	14
5	**Drug distribution** • Drug distribution (in- patients and out - patients) – Definition, advantages and disadvantages of individual prescription order method, Floor Stock Method, Unit Dose Drug Distribution Method, Drug Basket Method. • Distribution of drugs to ICCU/ICU/NICU/Emergency wards. • Automated drug dispensing systems and devices • Distribution of Narcotic and Psychotropic substances and their storage	7
6	Compounding in Hospitals. Bulk compounding, IV admixture services and incompatibilities, Total parenteral nutrition	4
7	**Radio Pharmaceuticals -** Storage, dispensing and disposal of radiopharmaceuticals	2
8	Application of computers in Hospital Pharmacy Practice, Electronic health records, Softwares used in hospital pharmacy	2
9	**Clinical Pharmacy:** Definition, scope, and development - in India and other countries Technical definitions, common terminologies used in clinical settings and their significance such as Paediatrics, Geriatric, Anti-natal Care, Post-natal Care, etc.	12

	Daily activities of clinical pharmacists: Definition, goal, and procedure of • Ward round participation • Treatment Chart Review • Adverse drug reaction monitoring • Drug information and poisons information • Medication history • Patient counselling • Interprofessional collaboration **Pharmaceutical care**: Definition, classification of drug related problems. Principles and procedure to provide pharmaceutical care **Medication Therapy Management, Home Medication Review**	
10	**Clinical laboratory tests used in the evaluation of disease states - significance and interpretation of test results** • Haematological, Liver function, Renal function, thyroid function tests • Tests associated with cardiac disorders • Fluid and electrolyte balance • Pulmonary Function Tests	10
11	**Poisoning**: Types of poisoning: Clinical manifestations and Antidotes **Drugs and Poison Information Centre and their services** – Definition, Requirements, Information resources with examples, and their advantages and disadvantages	6
12	**Pharmacovigilance** • Definition, aim and scope • Overview of Pharmacovigilance	2
13	**Medication errors**: Definition, types, consequences, and strategies to minimize medication errors, LASA drugs and Tallman lettering as per ISMP **Drug Interactions:** Definition, types, clinical significance of drug interactions	6

HOSPITAL AND CLINICAL PHARMACY – PRACTICAL

Course Code: ER20-25P **25 Hours (1 Hour / Week)**

Scope: This course is designed to train the students to assist other healthcare providers in the basic services of hospital and clinical pharmacy.

Course Objectives: This course will train the students with hands-on experiences, simulated clinical case studies in the following:

1. Methods to systematically approach and respond to drug information queries
2. How to interpret common laboratory reports to understand the need for optimizing dosage regimens
3. How to report suspected adverse drug reactions to the concerned authorities
4. Uses and methods of handling various medical/surgical aids and devices
5. How to interpret drug-drug interactions in the treatment of common diseases.

Course Outcomes: Upon completion of the course, the students will be able to

1. Professionally handle and answer the drug information queries
2. Interpret the common laboratory reports
3. Report suspected adverse drug reactions using standard procedures
4. Understand the uses and methods of handling various medical/surgical aids and devices
5. Interpret and report the drug-drug interactions in common diseases for optimizing the drug therapy

Note: Few of the experiments of Hospital and Clinical Pharmacy practical course listed here require adequate numbers of desktop computers with internet connectivity, adequate drug information resources including reference books, different types of surgical dressings and other medical devices and accessories. Various charts, models, exhibits pertaining to the experiments shall also be displayed in the laboratory.

Practicals

1. Systematic approach to drug information queries using primary / secondary / tertiary resources of information (2 cases)
2. Interpretation of laboratory reports to optimize the drug therapy in a given clinical case (2 cases)
3. Filling up IPC's ADR Reporting Form and perform causality assessments using various scales (2 cases)
4. Demonstration / simulated / hands-on experience on the identification, types, use / application /administration of
    - Orthopaedic and Surgical Aids such as knee cap, LS belts, abdominal belt, walker, walking sticks, etc.

- Different types of bandages such as sterile gauze, cotton, crepe bandages, etc.
- Needles, syringes, catheters, IV set, urine bag, RYLE's tube, urine pots, colostomy bags, oxygen masks, etc.

5. Case studies on drug-drug interactions (any 2 cases)
6. Wound dressing (simulated cases and role play –minimum 2 cases)
7. Vaccination and injection techniques (IV, IM, SC) using mannequins (5 activities)
8. Use of Hospital Pharmacy Software and various digital health tools

Assignments

The students shall be asked to submit written assignments on the following topics (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

1. Typical profile of a drug to be included in the hospital formulary
2. Brief layout and various services of the Central Sterile Supplies Department (CSSD)
3. Various types of sterilizers and sterilization techniques used in hospitals
4. Fumigation and pesticide control in hospitals
5. Role of Pharmacists in Transition of Care: Discharge cards, post hospitalization care, medicine reconciliation activities in developed countries
6. Total parenteral nutrition and IV admixtures and their compatibility issues
7. Concept of electronic health records
8. Invasive and Non-invasive diagnostic tests - HRCT, MRI, Sonography, 2D ECHO, X-rays, Mammography, ECG, EMG, EEG
9. Home Diagnostic Kits - Pregnancy Test, COVID testing etc
10. Measures to be taken in hospitals to minimize Antimicrobial Resistance
11. Role and responsibilities of a pharmacist in public hospital in rural parts of the country
12. Safe waste disposal of hospital waste

Field Visit

The students shall be taken in groups to visit a Government / private healthcare facility to understand and witness the various hospital and clinical pharmacy services provided. Individual reports from each student on their learning experience from the field visit shall be submitted.

PHARMACY LAW AND ETHICS – THEORY

Course Code: ER20-26T **75 Hours (3 Hours/week)**

Scope: This course is designed to impart basic knowledge on several important legislations related to the profession of pharmacy in India

Course Objectives: This course will discuss the following

1. General perspectives, history, evolution of pharmacy law in India
2. Act and Rules regulating the profession and practice of pharmacy in India
3. Important code of ethical guidelines pertaining to various practice standards
4. Brief introduction to the patent laws and their applications in pharmacy

Course Outcomes: Upon successful completion of this course, the students will be able to

1. Describe the history and evolution of pharmacy law in India
2. Interpret the act and rules regulating the profession and practice of pharmacy in India
3. Discuss the various codes of ethics related to practice standards in pharmacy
4. Interpret the fundamentals of patent laws from the perspectives of pharmacy

Chapter	Topics	Hours
1	General Principles of Law, History and various Acts related to Drugs and Pharmacy profession	2
2	**Pharmacy Act-1948 and Rules:** Objectives, Definitions, Pharmacy Council of India; its constitution and functions, Education Regulations, State and Joint state pharmacy councils, Registration of Pharmacists, Offences and Penalties. **Pharmacy Practice Regulations 2015**	5
3	**Drugs and Cosmetics Act 1940 and Rules 1945 and New Amendments** Objectives, Definitions, Legal definitions of schedules to the Act and Rules **Import of drugs** – Classes of drugs and cosmetics prohibited from import, Import under license or permit.	23

	Manufacture of drugs – Prohibition of manufacture and sale of certain drugs, Conditions for grant of license and conditions of license for manufacture of drugs, Manufacture of drugs for test, examination and analysis, manufacture of new drug, loan license and repacking license. Study of schedule C and C1, G, H, H1, K, P, M, N, and X. ***Sale of Drugs*** – Wholesale, Retail sale and Restricted license, Records to be kept in a pharmacy Drugs Prohibited for manufacture and sale in India ***Administration of the Act and Rules*** – Drugs Technical Advisory Board, Central Drugs Laboratory, Drugs Consultative Committee, Government analysts, licensing authorities, controlling authorities, Drug Inspectors.	
4	**Narcotic Drugs and Psychotropic Substances Act 1985 and Rules** Objectives, Definitions, Authorities and Officers, Prohibition, Control and Regulation, Offences and Penalties.	2
5	**Drugs and Magic Remedies (Objectionable Advertisements) Act 1954** Objectives, Definitions, Prohibition of certain advertisements, Classes of Exempted advertisements, Offences and Penalties.	2
6	**Prevention of Cruelty to Animals Act-1960**: Objectives, Definitions, CPCSEA - brief overview, Institutional Animal Ethics Committee, Breeding and Stocking of Animals, Performance of Experiments, Transfer and Acquisition of animals for experiment, Records, Power to suspend or revoke registration, Offences and Penalties.	2
7	**Poisons Act-1919**: Introduction, objective, definition, possession, possession for sales and sale of any poison, import of poisons	2
8	**FSSAI (Food Safety and Standards Authority of India) Act and Rules**: brief overview and aspects related to manufacture, storage, sale, and labelling of Food Supplements	2

9	**National Pharmaceutical Pricing Authority**: Drugs Price Control Order (DPCO) - 2013. Objectives, Definitions, Sale prices of bulk drugs, Retail price of formulations, Retail price and ceiling price of scheduled formulations, Pharmaceutical Policy 2002, National List of Essential Medicines (NLEM)	5
10	**Code of Pharmaceutical Ethics**: Definition, ethical principles, ethical problem solving, registration, code of ethics for Pharmacist in relation to his job, trade, medical profession and his profession, Pharmacist's oath.	5
11	Medical Termination of Pregnancy Act and Rules – basic understanding, salient features, and Amendments	2
12	Role of all the government pharma regulator bodies – Central Drugs Standards Control Organization (CDSCO), Indian Pharmacopoeia Commission (IPC)	1
13	Good Regulatory practices (documentation, licenses, renewals, e-governance) in Community Pharmacy, Hospital pharmacy, Pharma Manufacturing, Wholesale business, inspections, import, export of drugs and medical devices	3
14	Introduction to BCS system of classification, Basic concepts of Clinical Trials, ANDA, NDA, New Drug development, New Drugs and Clinical Trials Rules, 2019. Brand v/s Generic, Trade name concept, Introduction to Patent Law and Intellectual Property Rights, Emergency Use Authorization	7
15	Blood bank – basic requirements and functions	2
16	Clinical Establishment Act and Rules – Aspects related to Pharmacy	2
17	Biomedical Waste Management Rules 2016 – Basic aspects, and aspects related to pharma manufacture to disposal of pharma / medical waste at homes, pharmacies, and hospitals	2
18	Bioethics - Basic concepts, history and principles. Brief overview of ICMR's National Ethical Guidelines for Biomedical and Health Research involving human participants	2
19	Introduction to the Consumer Protection Act	1
20	Introduction to the Disaster Management Act	1
21	Medical Devices – Categorization, basic aspects related to manufacture and sale	2

Assignments

The students shall be asked to submit written assignments on the following topics (One assignment per student per sessional period. i.e., a minimum of THREE assignments per student)

1. Requirements for Ayurvedic, Homeopathic manufacturing, sale, and licensing requirements
2. Layout and contents of official websites of various agencies regulating the profession of pharmacy in India: e.g., CDSCO, SUGAM portal, PCI, etc.
3. Licenses required, application processes (online/offline), drug regulatory office website of the respective state
4. Case studies – actions taken on violation of any act / rule related to pharmacy
5. Schedule H1 drugs and its implementation in India
6. Counterfeit / Spurious medicines
7. Drug Testing Labs in India
8. Overview of Pharma marketing practices
9. Generic Medicines

9. Appendices

No	Appendix Document
1.	A typical format for the assessment of an Assignment
2.	A typical format for the assessment of a Field Visit Report
3.	List of instruments and equipment required for the conduct of D.Pharm program as per ER-2020

Appendix – 1

A typical format for the assessment of an Assignment

Name of the College:

Name of the Student:	
Academic Year of the Student:	
Name of the Subject:	
Title of the Assignment:	
Date on which the Assignment was given:	
Date on which the Assignment was submitted:	
Name & Designation of the Evaluator:	
Signature of the Evaluator with Date:	

Directions: For **evaluation**, enter rating of the student utilizing the following scale:

5 – Excellent; 4 - Very Good; 3 – Good; 2 – Satisfactory; 1 - Poor

Assessment Criteria	Score	Comments if any
a. Relevance with the content		
b. Use of resource material		
c. Organization & mechanical accuracy		
d. Cohesion & coherence		
e. Language proficiency & Timely submission		
Total Score		

Signature of the Student with Date:

Note: Subject teacher should try to cover all assignments mentioned in the list for each practical subject by assigning the topics to the students. Students should be encouraged to submit an assignment (in a format decided by the Institute) and encouraged to present assignments (at least any one assignment per subject) in the class.

Appendix – 2

A typical format for the assessment of a Field Visit Report

Name of the College:

Name of the Student:	
Academic Year of the Student:	
Name of the Subject:	
Name & full address of the organization visited:	
Date and Duration of Visit:	
Name & Designation of the Evaluator:	
Signature of the Evaluator with Date:	

Objectives set for the field visit: (give 2 – 4 objectives one by one)
Prior preparation of the student for the field visit: (minimum 100 words)
Describe the general experiences during the field visit: (minimum 100 words)
Learning points: Describe what theoretical concept that is correlated during the field visit: (minimum 300 words)

Appendix – 3

List of Instruments and Equipment required for the Conduct of D.Pharm program as per ER-2020

As per ER 2020 regulation;

At least four laboratories specified below should be provided for:

1. Pharmaceutics Lab.
2. Pharm. Chemistry Lab.
3. Physiology, Pharmacology and Pharmacognosy Lab.
4. Biochemistry, Clinical Pathology, Hospital and Clinical Pharmacy Lab.

The institutions shall provide "Model Pharmacy" as per following details

Model Pharmacy	No.	Area
Essential: Running Model Community Pharmacy **Desirable:** Drug Model Store	01	80 Sq. Mts. (Including 10 Sq. mt. for Drug Information Centre & 10 Sq. mt. for Patient Counselling)

NOTE: Wherever animal experimentations are prescribed in the curriculum, the required knowledge and skill should be imparted by using computer assisted modules. Animal hold area shall be as per the Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA) guidelines.

Practical of Social Pharmacy, Pharmacotherapeutics can be conducted in any one of the laboratories by making necessary provisions.

Department wise List of Minimum Equipment required for D.Pharm (For a practical batch of 20 students)

1. Physiology, Pharmacology and Pharmacognosy Lab.

S. No.	Name	Minimum required Nos. for DPharm 60 intake
1	Microscopes	20
2	Haemocytometer with Micropipettes	20
3	Sahli's haemoglobinometers	20
4	Sphygmomanometers	5
5	Stethoscopes	10
6	Human Permanent Slides for various tissues	One pair of each tissue Organs and endocrine glands
7	Models for various organs	One model of each organ system
8	Specimen for various organs and systems	One model for each organ system
9	Human Skeleton and bones	One set of skeleton and one spare bone
10	Different Contraceptive Devices and Models	One set of each device
11	Digital Balance (10 mg Sensitivity)	1
12	Computer with LCD	1
13	Licensed Software packages for Physiological & Pharmacological experiment	1
14	IR Thermometer	2
15	Refrigerator	1
16	First aid equipment	Adequate number
17	Stop watch	20
18	Dummy Inhalers and Nebulizer	1
19	Pharmacotherapeutic charts for various diseases & disorders	Adequate number
20	Surgical devices and Sutures	Adequate number
21	Digital BP Instrument	5
22	Mercury Thermometer	10
23	Digital Thermometer	10
24	Pulse Oximeter	5
25	ESR Apparatus (Westergren and Wintrobe)	10
26	Peak Flow meter	10
27	Stadiometer	2
28	Adult Weighing Scale (150 kg)	5
29	Glucometer	10
30	Projection microscope	1
31	Permanent slide set of plants and charts for Pharmacognosy Lab	Adequate number
32	Drug information resources	Adequate number
33	Various types of PPE Kits,	Adequate number

34	Charts /displays/ AVs on tobacco control, glycemic index of foods, nutrition, reproductive health	Adequate number
35	Menstrual hygiene products	Adequate number
36	Display for various disinfectants, mosquito repellents etc	Adequate number
37	Water Testing Kit	Adequate number
38	Permanent slide of different microbes	Adequate number

NOTE: Adequate number of glassware commonly used in the laboratory should be provided in each laboratory and department

2. Pharmaceutical Chemistry/ Biochemistry, Clinical Pathology

S. No.	Name	Minimum required Nos. for DPharm 60 intake
1	Hot plates	5
2	Hot Air Oven	1
3	Refrigerator	1
4	Analytical Balances for demonstration	1
5	Digital balance 10mg sensitivity	5
6	Magnetic Stirrers with Thermostat	10
7	Vacuum Pump	1
8	Digital pH meter	1
9	Wall Mounted Water Distillation Unit	2
10	Nessler's Cylinders	40
11	Digital Melting Point Apparatus	2
12	Thieles Tube	20
13	Digital Colorimeter	2
14	Thermostatic Water Bath	1

NOTE: Adequate number of glassware commonly used in the laboratory should be provided in each laboratory and department

3. Pharmaceutics

S. No.	Name	Minimum required Nos. for DPharm 60 intake
1	Digital balance (10mg)	5
2	Microscopes	10
3	Autoclave	1
4	Vacuum Pump	1
5	Standard sieves, sieve no. 8, 10, 12,22,24, 44, 54, 60, 80, 85, 100, 120	10 sets
6	Tablet dissolution test apparatus IP (Digital single/double Unit)	1
7	Magnetic stirrer, 500ml and 1 litter capacity with speed control	5

8	Digital pH meter	1
9	Capsule Counter	2
10	Hot Plate	2
11	Distillation Unit	1
12	Tablet counter – small size	2
13	Hot air oven	1
14	Electric water bath unit	2
15	Stalagmometer	5
16	Desiccator	5
17	Buchner Funnels (Medium)	10
18	Filtration assembly with Vacuum Pump	1
19	Andreasen's Pipette	5
20	Ointment slab	20
21	Ointment spatula	20
22	Pestle and mortar porcelain	20
23	Refrigerator	1
24	Micrometre slide Eyepiece	5
25	Micrometre slide Stage	5
26	Viscometer Ostwald/Brookfield	1
27	Stop watch	1
28	Sintered glass filter with vacuum	4

NOTE: Aseptic cabinet or area should be provided as per Appendix A of ER 2020 Adequate number of glassware commonly used in the laboratory should be provided in each laboratory and department

Machine Room

S. No.	Name	Minimum required Nos. for D.Pharm 60 intake
1	Capsule filling machine	1
2	Automated Single Station Tablet punching machine	1
3	Tablet disintegration test apparatus IP (Digital Single/Double unit)	1
4	Monsanto's hardness tester	2
5	Pfizer type hardness tester	2
6	Friability test apparatus (Digital Single/Double unit)	1
7	Sieve shaker with sieve set	1
8	Ointment filling machine	1
9	All purpose equipment with all accessories	1
10	Bottle washing Machine	1
11	Bottle Sealing Machine	1
12	Liquid Filling Machine	1
13	Ampoule washing machine	1
14	Ampoule filling and sealing machine (Jet Burner)	1

15	Clarity test apparatus	1
16	Collapsible tube – Filling and Sealing	1
17	Liquid Mixer	1

NOTE: Adequate number of glassware commonly used in the laboratory should be provided in each laboratory and department

4. Hospital and Clinical Pharmacy Lab

S. No.	Name	Minimum required Nos for D.Pharm 60 intake
1	Orthopaedical & Surgical Aids such as knee cap, LS belts, abdominal belt, walker, walking sticks, etc	Adequate Number
2	Different Types of bandages such as sterile gauze, cotton, crepe bandages, roll bandage etc	Adequate Number
3	Mannequins for CPR-1 (with indication Signals)	2
4	Mannequins for injection IV Arm	2
5	Variety of Needles	20
6	Variety of Syringes	20
7	Variety of catheters	5
8	IV set	20
9	Urine Bag	2
10	RYLE's tube	2
11	Urine pots	2
12	Colostomy bags	2
13	Oxygen masks	10
14	Inventory Software for Retail Pharmacy	1

NOTE: Adequate number of glassware commonly used in the laboratory should be provided in each laboratory and department

5. Model Pharmacy

S. No.	Name	Minimum required Nos. for D.Pharm 60 intake (
1	• Empty cartons of variety medicines (across variety dosage forms) • Various name plates indicating different parts of Pharmacy, • Proper arrangement of medicines, shelves, racks, drawers • Box/area for expiry medicines, • Display windows, shelves • Computer • Refrigerator • Designated patient counselling area, • Patient Information -Leaflets/Cards • Patient waiting area, • Drug Information books • Health information display, • Various devices for screening services (B.P. monitor, glucometer etc) • Height and body weight chart • Dummy devices (eg. Inhalers) • Display of pharmacist registration, license and other licenses • Display of name of owner • Inspection book, • Lock and key arrangement for Schedule X and NDPS medicines, • Bill book (dummy) , Computer stationary for bill printing	Adequate
2	Computers: hospital and community pharmacy management software	1

APPENDIX 4

Subject wise list of Recommended Books (Latest Edition)

Pharmaceutics

1. History of Pharmacy in India by Dr. Harikishan Singh
2. Indian Pharmacopoeia, Govt. of India Publication
3. A Text book of Pharmaceuticals Formulation by B.M. Mithal, Vallabh Prakashan.
4. Bentleys' Text book of Pharmaceutics, Editor E.A. Rawlins, Elsevier Int.,
5. The Theory and Practice of Industrial Pharmacy. Leon Lachman, Herbert Lieberman and Joseph Kanig, Editors, Lea and Febiger, Philadelphia. Varghese Publishing House
6. Responsible Use of Medicines: A Layman's Handbook, www.ipapharma.org / publications

Pharmaceutical Chemistry

1. Medicinal & Pharmaceutical chemistry by Harikishan Singh and VK Kapoor
2. Wilson and Griswold's Text book of Organic Medicinal and pharmaceutical Chemistry
3. Practical Organic Chemistry by Mann and Saunders.
4. Practical Pharmaceutical Chemistry, Volume- I & II by Beckett and J. B. Stenlake
5. Indian Pharmacopoeia
6. Vogel's text book of Practical Organic Chemistry

Pharmacognosy

1. Text book of Pharmacognosy by C. K. Kokate, S. B. Gokhale, A.P. Purohit, Nirali Prakashan
2. Text book of Pharmacognosy by C.S. Shah and J. S. Qadry, CBS Publishers & Distributors Pvt. Ltd.
3. Text Book of Pharmacognosy by T. E. Wallis. CBS Publishers & Distributors Pvt. Ltd.
4. Study of crude drugs by M. A. Iyengar, Manipal Press Ltd, Manipal
5. Powder crude drugs by M. A. Iyengar, Manipal Press Ltd, Manipal
6. Anatomy of crude drugs by M. A. Iyengar, Manipal Press Ltd, Manipal
7. Augmented Text Book of Homeopathic Pharmacy by Dr. D D Banerjee, B Jain Publishers (P) Ltd

Human Anatomy and Physiology

1. Human Physiology by C. C. Chatterjee
2. Human Anatomy and Physiology by S. Chaudhary and A. Chaudhary
3. Derasari and Gandhi's elements of Human Anatomy, Physiology and Health Education
4. S.R. Kale and R.R. Kale, Textbook of Practical Anatomy and Physiology
5. Ross and Wilson Anatomy and Physiology in Health and illness.
6. Human Anatomy and Physiology by Tortora Gerard J
7. Fundamentals of Medical Physiology by K. Sambulingam and P Sambulingam
8. Ranade V.G. Text Book of Practical Physiology
9. Goyal R.K., Natvar M.P. and Shah S.A., Practical Anatomy, Physiology and Biochemistry, Experimental Physiology

Social Pharmacy

1. Social Pharmacy – Innovation and development. Geoff Harding, Sarah Nettleton and Kevin Taylor. The Pharmaceutical Press.
2. Text Book of Community Pharmacy Practice. RPSGB Publication
3. Community Pharmacy Handbook- Jonathan Waterfield
4. S Khurana, P Suresh and R Kalsi. Health Education & Community Pharmacy. S Vikas & Co
5. Social Pharmacy: Tayler, Geoffrey. Pharmaceutical Press. London.
6. Textbook by Dandiya PC, Zafer ZYK, Zafer A. Health education & Community Pharmacy. Vallabh Prakashan.
7. Websites of Ministry of Health and Family Welfare, National Health Portal
8. Pharmacists at the Frontlines: A Novel Approach at Combating TB www.ipapharma.org Visit Publications
9. Where There Is No Doctor: A Village Health Care Handbook by David Werner ,2015 updated version
10. Various WHO publications www.who.int

Pharmacology

1. Pharma Satoskar, R.S. and Bhandarkar, S.D. Pharmacology and Pharmacotherapeutics
2. B. Suresh, A Text Book of Pharmacology
3. Derasari and Gandhi's Elements of Pharmacology
4. S.K. Kulkarni, Practical Pharmacology and Clinical Pharmacy
5. H.K. Sharma. Principles of Pharmacology
6. Mary J. Mycek, Lippincott Williams and Wilkins. Lippincott's illustrated Reviews: Pharmacology
7. Tripathi, K.D. Essentials of Medical Pharmacology.
8. Various Drug Information Books like British National Formulary, MIMS, CIMS, Drug Today etc., WHO, NIH Websites

Community Pharmacy and Management

1. Health Education and Community Pharmacy by N.S. Parmar.
2. WHO consultative group report.
3. Drug store and Business management by Mohammed Ali and Jyoti.
4. Handbook of pharmacy – health care. Edt. Robin J Harman. The Pharmaceutical Press
5. Comprehensive Pharmacy Review – Edt. Leon Shargel. Lippincott Williams and Wilkins.
6. Good Pharmacy Practices Training Manual by IPA/CDSCO/WHO India
7. Training Module for Community Pharmacists in TB Care and Control/ by MoH/IPA
8. Hand Book of PharmaSoS, Drugs in Special population- Pregnancy and Lactation, Tobacco free future- Choice is yours: KSPC Publications.
9. Responsible Use of Medicines: A Layman's Handbook, www.ipapharma.org /publications
10. Community Pharmacy Practice around the Globe: Part One: www.ipapharma.org /publications

Biochemistry and Clinical Pathology

1. Essentials of Biochemistry by U. Satyanarayana, Books and Allied (P) Ltd.
2. A Textbook of Biochemistry by A.V.S.S. Rama Rao, UBS Publishers' Distributors Pvt. Ltd.
3. Practical Biochemistry by R.C. Gupta and S. Bhargava.
4. Laboratory manual of Biochemistry by Pattabiraman and Sitaram Acharya

Pharmacotherapeutics

1. Clinical Pharmacy and Therapeutics - Roger and Walker, Churchill Livingstone Publication
2. Clinical Pharmacy and Therapeutics - Eric T. Herfindal, Williams and Wilkins Publication
3. Applied Therapeutics: The clinical Use of Drugs. Lloyd Young and Koda-Kimble MA Lippincott, Williams and Wilkins Publication.
4. Pharmacotherapy: A Pathophysiologic approach - Joseph T. Dipiro et al. Appleton and Lange Publication.
5. National Formulary of India, Indian Pharmacopoeia Commission, Ghaziabad.

Hospital and Clinical Pharmacy

1. A Textbook of Clinical Pharmacy Practice - Essential concepts and skills - Parthasarathi G, Karin Nyfort-Hansen and Milap Nahata. Orient Longman Pvt. Ltd. Hyderabad.
2. Text Book of Hospital and Clinical Pharmacy by Dr. Pratibha Nand and Dr. Roop K Khar, Birla publications, New Delhi.
3. Gupta B.K and Gupta R.N., GPP in Hospital Pharmacy, Vallabh Prakashan.
4. Basic skills in interpreting laboratory data - Scott LT, American Society of Health System Pharmacists Inc.
5. Australian drug information- Procedure manual. The Society of Hospital Pharmacists of Australia.

Pharmacy Law and Ethics

1. Text book of Forensic Pharmacy by B.M. Mithal
2. Forensic Pharmacy by B. Suresh
3. Hand book of drug law-by M.L. Mehra
4. A text book of Forensic Pharmacy by N.K. Jain
5. Drugs and Cosmetics Act/Rules by Govt. of India publications.
6. Medicinal and Toilet preparations Act 1955 by Govt. of India publications.
7. Narcotic Drugs and Psychotropic Substances Act by Govt. of India publications
8. Drugs and Magic Remedies Act by Govt. of India publications.
9. CDSCO Website, NPPA Website
10. Books on Drugs and Cosmetic Act by Nilesh Gandhi and Sudhir Deshpande
11. Text Book of Forensic Pharmacy by Dr Guruprasad Mohanta

SYLLABUS

D.Pharm.

ORDINANCE, SCHEME & SYLLABUS FOR DIPLOMA IN PHARMACY

Course Title: Diploma in Pharmacy
Abbreviation: D. Pharm.
Type of Course: A Two years Diploma course
Pattern: Yearly
Award of the Degree: Diploma will be awarded for those passing in both the years as per rules and regulations.

O-D. Ph. 1. DURATION OF THE COURSE: The duration of the course shall be for two academic years, with each academic year spread over a period of not less than one hundred and eighty working days in addition to 500 hours practical training spread over a period of not less than 3 months.

O-D. Ph.2. ELIGIBILITY FOR ADMISSION: No. Candidate shall be admitted to Diploma in Pharmacy Pt. I unless he/she had passed any of the following examinations in all the optional subjects and compulsory subjects (Physics, Chemistry, Biology and /or Mathematics including English as one of the Compulsory subjects):

a) Intermediate examination in Science; The First Year of the three year degree course in Science; 10+2 Examination(Academic stream) in Science;
b) Pre-degree examination; any other qualification approved by the Pharmacy Council of India as equivalent to any of the above exam.

Admission of candidates to the Diploma in Pharmacy Part - I shall be made in order of merit on the basis of 'Pre-Pharmacy Test' conducted in accordance with the scheme of Examinations and syllabus laid-down by the University.

O- D. Ph.3. ELIGIBILITY FOR APPEARING IN EXAMINATION

(a) Eligibility for appearing at the Diploma in Pharmacy Part-I Examination: Only such candidates who produce-certificate from the Head of the Academic Institution in which he/she has undergone the Diploma in Pharmacy Part-I course, in proof of his/her having regularly and satisfactorily undergone the course of study by attending not less than 75% of the classes held both in theory and in practical separately in each, shall be eligible for appearing at the Diploma in Pharmacy (Part-I) examination.
(b) Eligibility for appearing at the Diploma in Pharmacy Part-II Examination: Only such candidates who produce certificate from the Head of the academic institution in which he/she has undergone the Diploma in Pharmacy Part-II course, in proof of his/her having regularly and satisfactorily attending not less than 75% of the classes held both in theory and practicals separately in each subject, shall be eligible for appearing at the Diploma in Pharmacy (Part-II) examination.
(c) A candidate can have a relaxation of 10% attendance on medical ground by producing a certificate from medical officer of government hospital and a 5% relaxation by the vice chancellor on the recommendation of Dean, faculty.

O-D. Ph. 4.GENERAL

(A) **Course of Study**: The course of study for Diploma in Pharmacy part-I and Diploma in pharmacy part-II shall include the subjects as given in the Tables I & II below. The number of hours devoted to each subject for its teaching is given against columns 2 and 3 of the Tables below.

TABLE-I Diploma in Pharmacy (Part-I)

Subject	Theory		Practical	
	hours /year	Hrs. / week	hours /year	Hrs. / week
Pharmaceutics-I	75	3	100	4
Pharmaceutical Chemistry-I	75	3	75	3
Pharmacognosy	75	3	75	3
Biochemistry & Clinical Pathology	50	2	75	3
Human Anatomy & Physiology	75	3	50	2
Health Education & community pharmacy	50	2		
	400	16	375	15

TABLE-II Diploma in Pharmacy (Part-II)

Subject	Theory		Practical	
	hours /year	Hrs. / week	hours /year	Hrs. / week
Pharmaceutics-II	75	3	100	4
Pharmaceutical Chemistry-II	100	4	75	3
Pharmacology & Toxicology	75	3	50	2
Pharmaceutical Jurisprudence	50	2	-	
Drug store and Business Management	75	3	-	
Hospital & Clinical Pharmacy	75	3	50	2
	450	18	275	11

(b) Examinations: There shall be an examination for Diploma in Pharmacy (part-I) to examine students of the first year course and an examination for Diploma in Pharmacy (part-II) to examine students of the second year course. Each examination may be held twice every year. The first examination in every year shall be the annual examination and the second examination shall be supplementary examination of the Diploma in Pharmacy (part-I) or Diploma in pharmacy (Part-II)as the case may be. The examinations shall be of written and practical (including oral) nature. Carrying maximum marks for each part of subject, as indicated in Table III and IV:R-29(A) (Plan and scheme of examination for Diploma in Pharmacy).

O-D. Ph.5. PRACTICAL TRAINING

Diploma in Pharmacy (Part-III)

(a) Period and other conditions of practical training:

After having appeared in Part-II examination of Diploma in Pharmacy conducted by Board/University or other approved examination Body or any other course accepted as being equivalent by the Pharmacy Council of India, a candidate shall be eligible to undergo practical training in one or more of the following institutions namely:

Hospitals/Dispensaries run by Central/State Government/Municipal corporations/ central Government Health scheme and Employees state Insurance scheme. A pharmacy, chemist and Druggist licensed under the Drugs and cosmetics Rules, 1945 made under the Drugs and Cosmetics Act,1940(23 of 1940). The institutions referred in sub-regulation(1)shall be eligible to impart training subject to the condition that the number of student pharmacists that may be taken in any Hospital, pharmacy, Chemist and Druggist licensed under the Drugs and cosmetics Rules,1945 made under the

Drugs and cosmetics Act,1940 shall not exceed two where there is one registered pharmacist engaged in the work in which the student pharmacist is under going practical training, where there is more than one registered pharmacist similarly engaged, the number shall not exceed one for each additional such registered pharmacist. Hospital and Dispensary other than those specified in sub-regulation(1)for the purpose of giving practical training shall have to be recognized by pharmacy council of India on fulfilling the conditions specified in Appendix-D to these regulations.

In the course of practical training, the trainees shall have exposure to: Working knowledge of keeping of records required by various acts concerning the profession of pharmacy and Practical experience in the manipulation of pharmaceutical apparatus in common use, the reading, translation and copying of prescription including checking of dose, the dispensing of prescriptions illustrating the commoner methods of administering medicaments; the storage of drugs and medical preparations. The practical training shall be not less than five hundred hours spread over a period of not less than three months provided that not less than two hundred and fifty hours and devoted to actual dispensing of prescriptions.

(b) **Procedure to be followed prior to commencing of the training**:

The head of the academic training institution, shall supply application in triplicate in' Practical Training Contract Form for Qualification as pharmacist' to candidate eligible to under-take the said practical training, the contract form shall be as specified in Appendix-E to these regulations.

The head of an academic training institution shall fill section I of the contract Form. The trainee shall fill section II of the said contract Form and the Head of the institution agreeing to impart the training (hereinafter referred to as the Apprentice Master) shall fill section III of the said contract Form.

It shall be the responsibility of the trainee to ensure that one copy (hereinafter referred to as the first copy of the contract Form)so filled is submitted to Head of the academic training institution and the other two copies(hereinafter referred to as the second copy and the third copy)shall be filled with Apprentice Master(if he so desires)or with the trainee pending completion of the training.

(c) Certificate of Passing Diploma in Pharmacy(part-III) on satisfactory completion of the apprentice period, the Apprentice Master shall fill Section IV of the second copy and third copy of contract form and cause it to be sent to the head to the academic training institution who shall suitably enter in the first copy of the entries from the second copy and third copy and shall fill section V of the three copies of contract form and thereafter handover both the second copy and the third copy to the trainee. Thus, if completed in all respect, shall be regarded as a certificate of having successfully completed the course of Diploma in Pharmacy (part-III).

O-D. Ph.6. Working out of Result

(a) Mode of examinations:

Each theory and practical examination in the subject mentioned in Table-III and IV shall be of three hours duration. A candidate who fails in theory or practical examination shall reappear in such theory or practical paper(s) as the case may be. Practical examination shall also consist of viva voce (oral) examination.

(b) Award of sessional marks and maintenance of records:

A regular record of both theory and practical class work and examinations conducted in an institution imparting training for Diploma in Pharmacy Part-I and Diploma in pharmacy Part-II courses, shall be maintained for each student in the institution and 20 marks for each theory and 20 marks for each practical subject shall be allotted as sessional.

There shall be at least three periodic sessional examinations during each academic year. The highest aggregate of any two performances shall form the basis of calculating sessional marks.

The sessional marks in practicals shall be allotted on the following basis:

Actual performance in the sessional examination. 10

Day to day assessment in the practical class work. 10

(c) Minimum marks for passing the examination: A student shall not be declared to have passed Diploma in Pharmacy examination unless he/she secures atleast 40% marks in each of the subject separately in theory examination, including sessional marks and atleast 40% marks in each of the practical examination including sessional marks. The candidates securing 60% marks or above in aggregate in

all subjects in a single attempt at the Diploma in Pharmacy (part-I)or Diploma in Pharmacy(part-II)examinations shall be declared to have passed in first class the Diploma in Pharmacy(part-I)of Diploma in Pharmacy (part-II)examinations, as the case may be. Candidates securing 75% marks or above in any subject or subjects provided he/she passes in all the subjects in single attempt, will be given distinction in that subjects(s).

(d) Eligibility for Promotion to Diploma in Pharmacy (Pt. II): All candidates who have appeared for all the subjects and passed the Diploma in pharmacy part-I class. However failure in more than two subjects (each Theory paper or practical examination shall be considered as a subject) shall debar him/her from promotion to the Diploma in Pharmacy Part-II class. Such candidates shall be examined in the failing subjects only at subsequent. A candidate who fails to pass D Pharm Part - I exam. in four attempts shall not allowed to continue the course.

(e) Improvement of sessional marks: Candidates who wish to improve sessional marks can do so by appearing in two additional sessional examinations during the next academic year. The average score of the two examinations shall be the basis for improved sessional marks in theory. The sessional of practicals shall be improved by appearing in additional practical examinations. Marks awarded to a candidate for day to day assessment in the practical class, can not be improved unless he/she attends regular course of study again.

(f) Certificate of passing examination for Diploma in Pharmacy (part-II): Certificate of having passes the examination for the Diploma in pharmacy Part-II shall be granted by the Examining Authority to a successful student.

(g) Certificate of Diploma in Pharmacy: A certificate of Diploma in pharmacy shall be granted by the Examining Authority to successful candidate on producing certificate of having passed the Diploma in Pharmacy part-I and Part-II and satisfactory completion of practical training for Diploma in pharmacy (part-III).

(h) The chairman and at least one expert member of examining committee of the Examining Authority Concerned with appointment of examiners and conduct of pharmacy examination should be persons possessing pharmacy Qualifications.

PLAN AND SCHEME OF EXAMINATION FOR THE DIPLOMA IN PHARMACY

(Based on effective teaching for 180 working days in one academic session)

Table-III Diploma in pharmacy (part-I) Examination

Subject	Max. Marks in Theory			Max. Marks in Practical		
	Examination	Sessional	Total	Examination	Sessional	Total
Pharmaceutics-I	80	20	100	80	20	100
Pharmaceutical Chemistry-I	80	20	100	80	20	100
Pharmacognosy	80	20	100	80	20	100
Biochem. & Clinical Pathology	80	20	100	80	20	100
Human Anatomy & Physiology	80	20	100	80	20	100
Health Education & community pharmacy	80	20	100			
			600			500

TABLE-IV Diploma in Pharmacy (Part-II)

Subject	Max. Marks in Theory			Max. Marks in Practical		
	Examination	Sessional	Total	Examination	Sessional	Total
Pharmaceutics-II	80	20	100	80	20	100
Pharmaceutical Chemistry-II	80	20	100	80	20	100
Pharmacology & Toxicology	80	20	100	80	20	100
Pharmaceutical Jurisprudence	80	20	100			
Drug store and Business Management	80	20	100			
Hospital & Clinical Pharmacy	80	20	100	80	20	100
			600			400

Note: Each paper shall consist of six questions out of which five shall be attempted. Half of the total number of papers in each year will be set and assessed by external examiners and the remaining half will be set and assessed by the internal examiners. There shall be one external and one internal examiner for each practical Examination.

SYLLABUS

DIPLOMA IN PHARMACY (PART-I)

1.1 PHARMACEUTICS I

Theory (75 Hours)

Introduction of different dosage forms. Their classification with examples-their relative applications. Familiarization with new drug delivery systems. Introduction to Pharmacopoeias with special reference to the Indian Pharmacopoeia.

Metrology-System of weights and measures. Calculations including conversion from one to another system. Percentage calculations and adjustment of products .Use of alligation method in calculations .Isotonic solutions.

Packaging of pharmaceuticals-Desirable features of a container and types of containers. Study of glass & plastics as materials for containers and rubber as a material for closure-their merits and demerits. Introduction to aerosol packaging.
Size reduction, objectives, and factors affecting size reduction, methods of size reduction- study of Hammer mill, ball mill, Fluid energy mill and Disintegrator.

Size separation-size separation by sifting. Official standards for powders. Sedimentation methods of size separation. Construction and working of Cyclone separator.

Mixing and Homogenization-Liquid mixing and powder mixing, Mixing of semisolids. Study of silverson Mixer-Homogenizer, planetary Mixer; Agitated powder mixer; Triple Roller Mill; Propeller Mixer, colloid Mill and Hand Homogeniser. Double cone mixer.

Clarification and Filtration-Theory of filtration, Filter media; Filter aids and selection of filters. Study of the following filtration equipments-Filter Press, sintered filters, Filter candles, Metafilter.

Extraction and Galenicals-
(a) Study of percolation and maceration and their modification, continuous hot extraction-Application in the preparation of tinctures and extracts.
(b) Introduction to Ayurvedic dosage forms.
Heat process-Evaporation-Definition-Factors affecting evaporation-study of evaporating still and Evaporating pan.

Distillation-Simple distillation and Fractional distillation, steam distillation and vacuum distillation. Study of vacuum still, preparation of purified water I.P. and water for Injection I.P. construction and working of the still used for the same.

Introduction to drying process-Study of Tray Dryers; Fluidized Bed Dryer, Vacuum Dryer and Freeze Dryer.

Sterilization-Concept of sterilization and its differences from disinfection-Thermal resistance of microorganisms. Detailed study of the following sterilization process.
Sterilization with moist heat, Dry heat sterilization, Sterilization by radiation, Sterilization by filtration and Gaseous sterilization.

Aseptic techniques-Applications of sterilization process in hospitals particularly with reference to surgical dressings and intravenous fluids. Precautions for safe and effective handling of sterilization equipment.

Processing of Tablets-Definition; different type of compressed tables and their properties. Processes involved in the production of tablets; Tablets excipients ; Defects in tablets; Evaluation of Tablets; Physical standards including Disintegration and Dissolution. Tablet coating-sugar coating; films coating, enteric coating and micro-encapsulation (Tablet coating may be de.. in an elementary manner).

Processing of Capsules-Hard and soft gelatin capsules; different sizes of capsules; filling of capsules; handling and storage of capsules. Special applications of capsules.

Study of immunological products like sera, vaccines, toxoids & their preparations.

PRACTICAL (100 hours)

Preparation (minimum number stated against each of the following categories
illustrating different techniques involved.
1. Aromatic waters3
2. Solutions 4
3. Spirits2
4. Tinctures4
5. Extracts2
6. Creams2
7. Cosmetic preparations3
8. Capsules2
9. Tables2
10. Preparations involving2
11. Opthalmic preparations2
12. Preparations involving aseptic techniques2

Books recommended:(Latest editions)
1.) Remington's Pharmaceutical Sciences.
2.) The Extra Pharmacopoeia-Martindale.

1.2 PHARMACEUTICAL CHEMISTRY-I

THEORY (75 Hours)

General discussion on the following inorganic compounds including important physical and chemical properties, medicinal and pharmaceutical uses, storage conditions and chemical incompatibility.

Acids, bases and buffers-Boric acid, Hydrochloric acid, Strong Ammonium hydroxide, Sodium hydroxide and official buffers.

Antioxidants- Hypophosphorous acid, Sulphur dioxide, Sodium bisulphite, Sodium meta-bisulphite, Sodium thiosulphate, Nitrogen and Sodium nitrite.

Gastrointestinal agents-
Acidifying agents- Dilute Hydrochloric acid.
Antacids- Sodium bicarbonate, Aluminum hydroxide gel, Aluminum phosphate, Calcium carbonate, Magnesium carbonate, Magnesium trisilicate, Magnesium oxide, Combinations of antacid preparations.
Protective and Adsorbents- Bismuth sub carbonate and Kaolin.
Saline cathartics- Sodium potassium tartrate and Magnesium sulphate.

Topical Agents-
Protective- Talc, Zinc Oxide, Calamine, Zinc stearate, Titanium dioxide, silicone polymers.

Antimicrobials and Astringents- Hydrogen peroxide*, Potassium permanganate, Chlorinated lime, Iodine, Solutions of Iodine, Povidone-iodine, Boric acid, Borax, Silver nitrate, Mild silver protein, Mercury yellow, Mercuric oxide, Ammoniated mercury.
Sulphur and its compounds- Sublimed sulphur, Percipitated sulphur, Selenium sulphide.
Astringents- Alum and Zinc Sulphate.

Dental Products- Sodium fluoride, Stannous fluoride, Calcium carbonate, Sodium meta phosphate, Di-calcium phosphate ,Strontium chloride, Zinc chloride.
Inhalants- Oxygen, Carbon dioxide, Nitrous oxide.

Respiratory stimulants- Ammonium carbonate.

Expectorants and Emetics-Ammonium chloride*, Potassium iodide, Antimony potassium tartrate.

Antidotes- Sodium nitrite.

Major Intra and Extra cellular electrolytes-
Electrolytes used for replacement therapy- Sodium chloride and its preparations, Potassium chloride and its preparations.
Physiological acid-base balance and electrolytes used- Sodium acetate, Potassium Acetate, Sodium bicarbonate Inj., Sodium citrate, Potassium citrate, Sodium lactate injection, Ammonium chloride and its injection.

Combination of oral electrolyte powders and solutions.

Inorganic official compounds of Iron, Iodine and Calcium, Ferrous Sulphate and Calcium Gluconate.

Radio pharmaceuticals and contrast media- Radio activity-Alpha; Beta and Gamma Radiations, Biological effects of radiations, Measurement of radio activity, G.M. Counter, Radio isotopes-their uses, Storage and precautions with special reference to the official preparations. Radio opaque contrast media-Barium sulfate.

Quality control of Drugs and pharmaceuticals-Importance of quality control, significant errors, methods used for quality control, sources of impurities in pharmaceuticals. Limit tests for Arsenic, Chloride, Sulfate, Iron and Heavy metals.

Identification tests for cations and anions as per Indian Pharmacopoeia.

PRACTICAL (75 hours)

1. Identification tests for inorganic compounds particularly drugs and pharmaceuticals.
2. Limit test for chloride, Sulfate, Arsenic, Iron and Heavy metals.
3. Assay of inorganic pharmaceuticals involving each of the following methods of compounds marked with (*) under theory.
    i. Acid-Base titrations(at least 3)
    ii. Redox titrations (one each of permanganometry and iodimetry).
    iii. Precipitation titrations (at least 2)
    iv. Complexometric titration (Calcium and Magnesium).

Books recommended (Latest editions)
1. Indian pharmacopoeia.

1.3 PHARMACOGNOSY

THEORY (75 Hours)

1. Definition, history and scope of Pharmacogonosy including indigenous system of medicine.
2. Various systems of classification of drugs and natural origin.
3. Adulteration and drug evaluation; significance of pharmacopoeial standards.
4. Brief outline of occurrence, distribution, outline of isolation, identification tests, therapeutic effects and pharmaceutical application of alkaloids, terpenoids, glycosides, volatile oils, tannins and resins.
5. Occurrence, distribution, organoleptic evaluation, chemical constituents including tests wherever applicable and therapeutic efficacy of following categories of drugs.

(a) Laxatives- Aloes, Rhubarb, Castor oil, Ispaghula, Senna.
(b) Cardiotonics- Digitalis, Arjuna.
(c) Carminatives & G.I. regulators- Umbelliferous fruits, Coriander, Fennel, Ajowan, Cardamom, Ginger, Black pepper , Asafoetida, Nutmeg, Cinnamon, Clove.
(d) Astringents- Catecheu.
(e) Drugs acting on nervous system- Hyoscyamus, Belladonna, Aconite, Ashwagandha, Ephedra, Opium, Cannabis, Nux -vominca.
(f) Antihypertensive- Rauwolfia.
(g) Antitussives- Vasaka, Tolu balsam, Tulsi.
(h) Antirheumatics- Guggal, Colchicum.
(i) Antitumour- Vinca.
(j) Antileprotics- Chaulmoogra oil.
(k) Antidiabetics- Pterocarpus, Gymnema sylvestro.
(l) Diuretics- Gokhru, Punarnava.
(m) Antidysenterics- Ipecacuanha.
(n) Antiseptics and disinfectants- Benzoin, Myrrh, Neem, Curcuma.
(o) Antimalarials- Cinchona.
(p) Oxytocics- Ergot.
(q) Vitamins- Shark liver oil and Amla.
(r) Enzymes- Papaya, Diastase, Yeast.
(s) Perfumes and flavoring agents- peppermint oil, Lemon oil, Orange oil, lemon grass oil, sandal wood.

Pharmaceutical aids-Honey, Arachis oil, starch, kaolin, pectin, olive oil. Lanolin, Beeswax, Acacia, Tragacanth, sodium Alginate, Agar, Guar
gum, Gelatin.

Miscellaneous- Liquorice, Garlic, picrorhiza, Dirscorea, Linseed, shatavari, shankhpushpi, pyrethrum, 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, fennal, clove, Ginger, Nuxvomica & ipecacuanha.

PRACTICAL (75 hours)

1. Identification of drugs by morphological characters. Physical and chemical tests for evaluation of drugs wherever applicable.
2. Gross anatomical studies(t.s.)of the following drugs :Senna, Datura, cinnamon, cinchona, coriander, fennel , clove, Ginger, Nux-vomica, Ipecacuanha.
3. Identification of fibers and surgical dressing.

1.4 BIOCHEMISTRY AND CLINICAL PATHOLOGY

THEORY (50 Hours)

Introduction to biochemistry. Brief chemistry and role of proteins, polypeptides and amino acids, classification, Qualitative tests, Biological value, Deficiency diseases.
Carbohydrates: Brief chemistry and role of carbohydrates, classification, qualitative tests, Diseases related to carbohydrate metabolism.
Lipids: Brief chemistry and role of lipids, classification and qualitative tests. Diseases related to lipids metabolism.
Vitamins: Brief chemistry and role of vitamins and coenzymes. Role of minerals and water in life processes.
Enzymes: Brief concept of enzymatic action. factors affecting it.
Therapeutics: Introduction to pathology of blood and urine. Lymphocytes and platelets, their role in health and disease. Erythrocytes-Abnormal cells and their significance. Abnormal constituents of urine and their significance in diseases.

PRACTICAL (75 Hours)

1. Detection and identification of proteins. Amino acids, carbohydrates and lipids.
2. Analysis of normal and abnormal constituents of Blood and Urine (Glucose, urea, creatine, cretinine, cholesterol, alkaline phosphatatase acid phosphatase, Bilirubin, SGPT, SGOT, calcium, Diastase, Lipase).
3. Examination of sputum and faeces (microscopic & staining).
4. Practice in injecting drugs by intramuscular, subcutaneous and intravenous routes, withdrawal of blood samples.

1.5 HUMAN ANATOMY AND PHYSIOLOGY

THEORY(75 Hours)

Scope of Anatomy and physiology. Definition of various terms used in Anatomy. Structure of cell, function of its components with special reference to mitochondria and microsomes.

Elementary tissues: Elementary tissues of the body, i.e. epithelial tissue, muscular tissue, connective tissue and nervous tissue.

Skeltal System: Structure and function of Skelton .Classification of joints and their function. Joint disorders.

Cardiovascular System: Composition of blood, functions of blood elements. Blood group and coagulation of blood. Brief information regarding disorders of blood. Name and functions of lymph glands. Structure and functions of various parts of the heart .Arterial and venous system with special reference to the names and positions of main arteries and veins. Blood pressure and its recording. Brief information about cardiovascular disorders.

Respiratory system: Various parts of respiratory system and their functions, physiology of respiration.

Urinary System: Various parts of urinary system and their functions, structure and functions of kidney. Physiology of urine formation. Patho-physiology of renal diseases and edema.

Muscular System: Structure of skeletal muscle, physiology of muscle contraction. Names, positions, attachments and functions of various skeletal muscles. physiology of neuromuscular junction.

Central Nervous System: Various parts of central nervous system, brain and its parts, functions and reflex action. Anatomy and physiology of automatic nervous system.

Sensory Organs: Elementary knowledge of structure and functions of the organs of taste, smell, ear, eye and skin. Physiology of pain.

Digestive System: names of various parts of digestive system and their functions. structure and functions of liver, physiology of digestion and absorption.

Endocrine System: Endocrine glands and Hormones. Location of glands, their hormones and functions. pituitary, thyroid. Adrenal and pancreas

Reproductive system: Physiology and Anatomy of Reproductive system.

PRACTICALS (50 hours)

1. Study of the human Skelton.
2. Study with the help of charts and models of the following system and organs:

Digestive system	Respiratory system	Ear
Cardiovascular system	Urinary system	
Reproductive system	Eye	

3. Microscopic examination of epithelial tissue, cardiac muscle, smooth muscle, skeletal muscle. Connective tissue and nervous tissues.
4. Examination of blood films for TLC.DLC and malarial parasite.
5. Determination of RBCs, clotting time of blood, erythrocyte sedimentation rate and Hemoglobin value.
6. Recording of body temperature, pulse, heart-rate, blood pressure and ECG.

1.6 HEALTH EDUCATION AND COMMUNITY PHARMACY

THEORY (50 hours)

Concept of health: Definition of physical health, mental health, social health, spiritual health determinants of health, indicatory of health, concept of disease, natural history of diseases, the disease agents, concept of prevention of diseases.
Nutrition and health: Classification of foods, requirements, diseases induced due to deficiency of proteins, vitamins and minerals-treatment and prevention.
Demography and family planning: Demography cycle, fertility, family planning, contraceptive methods, behavioral methods, natural family planning methods, chemical methods, mechanical methods, hormonal contraceptives, population problem of India.
First aid: Emergency treatment in shock, snake-bite, burns, poisoning, heart disease, fractures and resuscitation methods, Elements of minor surgery and dressings.
Environment and health: Source of water supply, water pollution, purification of water, health and air, noise, light-solid waste disposal and control-medical entomology, arthropod borne diseases and their control. rodents, animals and diseases.
Fundamental principles of microbiology: Classification of microbes, isolation, staining techniques of organisms of common diseases.
Communicable diseases: Causative agents, mode of transmission and prevention. Respiratory infections-chicken pox, measles, influenza, diphtheria, whooping cough and tuberculosis.
Intestinal infection-poliomyelitis, Hepatitis, cholera, Typhoid, food poisoning, Hookworm infection.
Arthropod borne infections-plague, Malaria, filariases.
Surface infection-Rabies, Tranchoma, Tetanus, Leprosy.
Sexually transmitted diseases-Syphilis, Gonorrhoea, AIDS.
Non-communicable diseases: causative agents, prevention, care and control.
Epidemiology: Its scope, methods, uses, dynamics of disease transmission. Immunity and immunization: Immunological products and their dose schedule. Principles of disease control and prevention, hospital acquired infection, prevention and control. Disinfection, types of disinfection procedures, for-faces, urine, sputum, room linen, dead-bodies, instruments.

2.1 PHARMACEUTICS II
(Dispensing Pharmacy)

THEORY (75 Hours)

Prescriptions-Reading and understanding of prescriptions; Latin terms commonly used (Detailed study is not necessary), Modern methods of prescribing, adoption of metric system. Calculations involved in dispensing.
Incompatibilities in prescriptions- study of various types of incompatibilities-physical, chemical and therapeutic.
Posology- Dose and dosage of drugs, factors influencing dose, calculations of doses on the basis of age, sex, surface area and veterinary doses.
Dispensed Medications: (Note: A detailed study of the following dispensed medication is necessary. Methods of preparation with theoretical and practical aspects, use of appropriate containers and closures. special labeling requirements and storage conditions should be high-lighted).
Powders-Type of powders-Advantages and disadvantages of powders, Granules, cachets and tablet triturates. preparation of different types of powders encountered in prescriptions. Weighing methods, possible errors in weighing, minimum weighable amounts and weighing of a material below the minimum weighable amount, geometric dilution and proper usage and care of dispensing balance.

Liquid oral Dosage forms:
Monophasic-Theoretical aspects including commonly used vehicles, essential adjuvant like stabilizers, colorants and flavors, with examples.
Review of the following monophasic liquids with details of formulation and practical methods. Liquids for internal administration Liquids for external administration or used on mucous membranes
Mixtures and concentrates, Gargles

Syrups Mouth washes	Throat-paints	Elixirs
Douches	Ear Drops	Nasal drops
Sprays	Liniments	Lotions.

Biphasic Liquid Dosage Forms:
Suspensions (elementary study)-Suspensions containing diffusible solids and liquids and their preparations. Study of the adjuvant used like thickening agents, wetting agents, their necessity and quantity to be incorporated ,suspensions of precipitate forming liquids like tinctures, their preparations and stability. suspensions produced by chemical reaction. An introduction to flocculated /non-flocculated suspension system.
Emulsions-Types of emulsions, identification of emulsion system, formulation of emulsions, selection of emulsifying agent. Instabilities in emulsions, preservation of emulsions.

Semi-Solid Dosage Forms:
Ointments: Types of ointments, classification and selection of dermatological vehicles. Preparation and stability of ointments by the following processes:

Trituration	fusion
chemical reaction	Emulsification.

Pastes: Differences between ointments and pastes, Bases of pastes. preparation of pastes and their preservation .
Jellies: An introduction to the different types of jellies and their preparation.
An elementary study of poultice.
Suppositories and peassaries-Their relative merits and demerits, types of suppositories, suppository bases , classification, properties. preparation and packing of suppositories. Use of suppositories of drug absorption.
Dental and cosmetic preparations: Introduction to Dentifrices, facial cosmetics, Deodorants. Anti-perspirants, shampoo, Hair dressings and Hair removers.
Sterile Dosage forms:

Parenteral dosage forms-Definition, General requirements for parenteral dosage forms. Types of parenteral formulations, vehicles, adjuvant, processing and personnel, Facilities and quality control. Preparation of Intravenous fluids and admixtures-Total parenteral nutrition, Dialysis fluids.
Sterility testing: particulate matter monitoring- Faculty seal packaging.
Ophthalmic products: study of essential characteristics of different ophthalmic preparations. Formulation: additives, special precautions in handling and storage of ophthalmic products.

PRACTICAL (100 hours)

Dispensing of at least 100 products covering a wide range of preparations such as mixtures, emulsion, solutions, liniments, E.N.T. preparations. Ointments, suppositories, powders, incompatible prescriptions etc.

Books recommended: (Latest editions)

1. Indian Pharmacopoeia.
2. British pharmacopoeia.
3. National formularies(N.F.I.,B.N.P)
4. Remington's pharmaceutical sciences.
5. Martindale's Extra pharmacopoeia.

2.2 PHARMACEUTICAL CHEMISTRY II

THEORY (100 hours)

1. Introduction to the nomenclature of organic chemical systems with particular reference to hetero-cyclic system containing up to 3 rings.
2. The chemistry of following pharmaceutical organic compounds covering their nomenclature, chemical structure, uses and the important physical and chemical properties(chemical structure of only those compounds marked with asterisk (*). The stability and storage conditions and the different type of pharmaceutical formulations of these drugs and their popular brand names.

Antiseptics and Disinfectants-Proflavine*, Benzalkonium chloride, Cetrimide, Phenol, chloroxylenol, Formaldehyde solution, Hexachlophene, Nitrofurantoin.
Sulphonamides- Sulphadiazine, Sulphaguanidine, Phthalylsulphathaizole, Succinylsulphathiazole, Sulphadimethoxine, Sulphamethoxypyridazine, Co-trimoxazole, sulfacetamide*
Antileprotic Drugs- Clofazimine , Thiambutosine, Dapsone*, solapsone,
Anti-tubercular Drugs- Isoniazid*, PAS*, Streptomycin, Rifampicin, Ethambutol*, Thiacetazone, Ethionamide, cycloserine, pyrazinamide*.
Antimoebic and Anthelmintic Drugs- Emetine, Metronidazole, Halogenated hydroxyquinolines, Diloxanide furoate, Paromomycin , Piperazine*, Mebendazole
,D.E.C.*
Antibiotics- Benzyl penicillin*, Phenoxy methyl penicillin*, Benzathine penicillin, Ampicillin*, Cloxacillin, Carbencicillin, Gentamicin, Neomycin, Erythromycin, Tetracycline, Cephalexin, Cephaloridine, Cephalothin, Griseofulvin, Chloramphenicol.
Antifungal agents- Udecylenic acid, Tolnaftate, Nystatin, Amphotericin, Hamycin.
Antimalarial Drugs-Chloroquine*,Amodiaquine, Primaquine, Proguanil, Pyrimethamine*, Quinine, Trimethoprim.
Tranquilizers-Chlorpromazine*, Prochlorperazine, Trifluoperazine, Thiothixene, Haloperiodol*, Triperiodol, Oxypertine, Chlordizepoxide, Diazepam*, Lorazepam, Meprobamate.
Hypnotics- Phenobarbitone*, Butobarbitone, Cylobarbitone, Nitrazepam, Glutethimide*, Methyprylon, Paraldehyde, Triclofosodium.
General Anaesthetics-Halothane*, Cyclopropane*, Diethyl ether*, Methohexital sodium, Thiopecal sodium, Trichloroethylene .
Antidepressant Drugs- Amitriptyline, Nortryptyline, Imperamine*, Phepelzine, Tranylcypromine.
Analeptics- Theophylline, Caffeine*, Coramine*, Dextro-amphetamine.

Adrenergic drugs- Adrenaline*, Noradrenaline, Isoprenaline*, Phenylephrine, Salbutamol, Terbutaline, Ephedrne*, Pseudoephedrine.
Adrenergic antagonist- Tolazoline, Propranolol*, Practolol.
Cholinergic Drugs- Neostigmine*, Pyridostigmine, Pralidoxime, Pilocarpine, Physostigmine*.
Cholinergic Antagonists- Atropine*, Hyoscine, Homatropine, Propantheline*, Benztropine, Tropicamide, Biperiden*.
Diuretic Drugs- Furosemide*, Chlorothiazide, Hydrochlorothiazidc*, Benzthiazide, Urea*, Mannitol*, Ethacrynic Acid.
Cardiovascular Drugs- Ethylnitrite*, Glyceryl trinitrate, Alpha methyldopa, Guanethidine, Clofibrate, Quinidine.
Hypoglycemie Agents- Insulin, Chlorpropamide*, Tolbutamide, Glibenclamide, Phenformin*, Metformin.
Coagulants and Anti coagulants- Heparin, Thrombin, Menadione*, Bisphydroxy-coumarin, Warfarin sodium.
Local Anaesthetics- Lignocaine*, Procaine*, Benzocaine,
Histamine and anti Histaminic Agents- Histamine, Diphenhydramine*, Promethazine, Cyproheptadine, Mepyramine*, Pheniramine, Chlorpheniramine*,
Analgesics and Anti-pyretics-Morphine, Pethidine, Codeine, Mathadone, Aspirin*, Paracetamol, Analgin, Dextropropoxphene, Pentazocine.
Non-steriodal anti-inflammatory agents- Indomethacin*, Phenylbutazone*, Oxyphenbutazone, Ibuprofen.
Thyroxine and Antithyroids- Thyroxine*, Methimazole, Methyl thiouracil, Propylthiouracil.
Diagnostic Agents- Lopanoic Acid, Propyliodone, Sulfobromopthalein-sodium, Indigotindisulfonate, Indigo Carmine, Evans blue, Congo Red, Fluorescein sodium.
Anticonvulsants, cardiac glycosides, Antiarrhythmic, Antihypertensives & Vitamins.
Steroidal Drugs- Betamethasone, Cortisone, Hydrocortisone, Prednisolone, Progesterone, Testosterone, Oestradiol, Nandrolone.
Anti-Neoplastic Drugs- Actinomycin, Azathioprie, Busulphan, Chloramubucil, Cisplatin, Cyclophosphamide, Daunorubicin Hydrochoride, Fluorouracil, Mercaptopurine, Methotrexate, Mytomycin.

Books Recommended: (Latest editions)

1. Pharmacopoeia of India.
2. British Pharmaceutical codex.
3. Martindale's Extra pharmacopoeia.

PRACTICAL (75 hours)

1. Systematic qualitative testing of organic drugs involving solubility determination, melting point and/or boiling point, detection of elements and functional groups (10 compounds).
2. Official identification tests for certain groups of drugs included in the I.P. like barbiturates, sulfonamides, Phenothiazines, Antibiotics etc.(8 compounds).
3. Preparation of three simple organic preparations.

2.3 PHARMACOLOGY & TOXICOLOGY

THEORY (75 hours)

Introduction to pharmacology, scope of pharmacology.

Routes of administration of drugs, their advantages and disadvantages. Various processes of absorption of drugs and the factors affecting them. Metabolism, distribution and excretion of drugs.

General mechanism of drugs action and their factors which modify drugs action. Pharmacological classification of drugs. The discussion of drugs should emphasize the following aspects:

Drugs acting on the central Nervous system:

General anaesthetics- adjunction to anaesthesia, intravenous anaesthetics.
Analgesic antipyretics and non-steroidal
Anti-inflammatory drugs- Narcotic analgesics.
Antirheumatic and anti-gout remedies.
Sedatives and Hypnotics, psychopharmacological agents, anticonvulsants, analeptics.
Centrally acting muscle relaxants and anti parkinsonism agents.
Local anesthetics.
Drugs acting on autonomic nervous system.
Cholinergic drugs, Anticholinergic drugs, anticholinesterase drugs.
Adrenergic drugs and adrenergic receptor blockers.
Neurone blockers and ganglion blockers.
Neuromuscular blockers, used in myasthenia gravis.
Drugs acting on eye: Mydriatics, drugs used in glaucoma.

Drugs acting on respiratory system
Respiratory stimulants, Bronchodilators, Nasal decongestants, Expectorants and Antitussive agents.

Autocoids: physiological role of histamine and serotonin, Histamine and Antihistamines, prostaglandins.

Cardio vascular drugs
Cardiotonics, Antiarrhythmic agents, Anti-anginal agents, Antihypertensive agents, peripheral Vasodilators and drugs used in atherosclerosis.
Drugs acting on the blood and blood forming organs. Haematinics, coagulants and anticoagulants, Haemostatic , Blood substitutes and plasma expanders.

Drugs affecting renal function- Diuretics and anti-diuretics.

Hormones and hormone antagonists- Hypoglycemic agents, Anti--thyroid drugs, sex hormones and oral contraceptives , corticosteroids.

Drugs acting on digestive system-carminatives, digest ants, Bitters, Antacids and drugs used in peptic ulcer, purgatives ,and laxatives, Antidiarrohoeals, Emetics, Anti-emetics, Antispasmodics.

Chemotherapy of microbial diseases:
Urinary antiseptics, sulphonamides, penicillin, streptomycin, Tetracyclines and other antibiotics. Anti-tubercular agents, Antifungal agents, antiviral drugs, anti-leprotic drugs.
Chemotherapy of protozoal diseases, Anthelmintic drugs.
Chemotherapy of cancer.

Disinfectants and antiseptics.

PHARMACOLOGY

PRACTICAL (50 hours)

1. The first six of the following experiments will be done by the students while
2. the remaining will be demonstrated by the teacher.
3. Effect of potassium and calcium ions, acetylcholine and adrenaline on frog's heart.
4. Effect of acetyl choline on rectus abdomens muscle of frog and guinea pig ileum.
5. Effect of spasmogens and relaxants on rabbits intestine.
6. Effect of local anaesthetics on rabbit cornea.
7. Effect of mydriatics and miotics on rabbit's eye.
8. To study the action of strychnine on frog.
9. Effect of digitalis on frog's heart.
10. Effect of hypnotics in mice.

11. Effect of convulsants and anticonvulsant in mice or rats.
12. Test for pyrogens.
13. Taming and hypnosis potentiating effect of chlorpromazine in mice/rats.
14. Effect of diphenhydramine in experimentally produced asthma in guinea pigs.

2.4 PHARMACEUTICAL JURISPRUDENCE

THEORY (50 hours)

Origin and nature of pharmaceutical legislation in India, its scope and objectives. Evolution of the "Concept of pharmacy" as an integral part of the Health care system.

Principles and significance of professional Ethics. Critical study of the code of pharmaceutical Ethics drafted by pharmacy council of India.

Pharmacy Act,1948-The General study of the pharmacy Act with special reference to Education Regulations ,Working of state and central councils, constitution of these councils and functions, Registration procedures under the Act.

The Drugs and Cosmetics Act,1940-General study of the Drugs and cosmetics Act and the Rules there under. Definitions and salient features related to retail and whole sale distribution of drugs. The powers of Inspectors, the sampling procedures and the procedure and formalities in obtaining licenses under the rule. Facilities to be provided for running a pharmacy effectively. General study of the schedules with special reference to schedules C,C1,F,G,J,H,P and X and salient features of labeling and storage conditions of drugs.

The Drugs and Magic Remedies (objectionable Advertisement)Act, 1954-General study of the Act, objectives , special reference to be laid on Advertisements, magic remedies and objections1 and permitted advertisements -diseases which cannot be claimed to be cured.

Narcotic Drugs and psychotropic substances Act,1985-A brief study of the act with special reference to its objectives, offences and punishment.

Brief introduction to the study of the following acts:
Latest Drugs (price control) order in force.

Poisons Act 1919(as amended to date)

Medicinal and Toilet preparations (excise Duties) Act, 1955 (as amended to date**).**

Medical Termination of Pregnancy Act, 1971(as amended to date).

Books recommended:(Latest editions)
Bare Acts of the said laws published by Government.

2.5 DRUG STORE AND BUSINESS MANAGEMENT

THEORY (75 hours)

Part I Commerce (50 hours)

Introduction-Trade, Industry and commerce, Functions and subdivision of commerce, Introduction to Elements for Economics and Management. Forms of Business Organizations. Channels of Distribution.

Drug House Management-selection of site, space Lay-out and legal requirements. Importance and objectives of purchasing, selection of suppliers, credit information, tenders, contracts and price determination and legal requirements thereto.Codification, handling of drug stores and other hospital supplies. Inventory Control-objects and importance, modern techniques like ABC,VED analysis, the lead time, inventory carrying cost, safety stock, minimum and maximum stock levels, economic order quantity, scrap and surplus disposal.

Sales promotion, Market Research, Salesmanship, qualities of a salesman, Advertising and Window Display.

Recruitment, training, evaluation and compensation of the pharmacist.

Banking and Finance-Service and functions of bank, Finance planning and sources of finance.

Part II Accountancy (25 hours)

Introduction to the accounting concepts and conventions. Double entry Book Keeping, Different kinds of accounts. Cash Book. General Ledger and Trial Balance. Profit and Loss Account and Balance Sheet. Simple techniques of analyzing financial statements. Introduction to Budgeting.

Books Recommended: (Latest editions)

2.6 HOSPITAL AND CLINICAL PHARMACY

THEORY (75 hours)

Part-I: Hospital Pharmacy:

Hospital-Definition, Function, classifications based on various criteria, organization, Management and health delivery system in India.

Hospital Pharmacy: Definition Functions and objectives of Hospital pharmaceutical services. Location, Layout, Flow chart of materials and men.
Personnel and facilities requirements including equipments based on individual and basic needs. Requirements and abilities required for Hospital pharmacists.
Drug Distribution system in Hospitals. Out-patient service,
In-patient services- types of services detailed discussion of unit Dose system, Floor ward stock system, satellite pharmacy services, central sterile services, Bed side pharmacy.

Manufacturing: Economical considerations, estimation of demand.

Sterile manufacture-Large and small volume parenterals, facilities, requirements, layout production planning , man-power requirements.

Non-sterile manufacture-Liquid orals, externals, Bulk concentrates. Procurement of stores and testing of raw materials.

Nomenclature and uses of surgical instruments and Hospital Equipments and health accessories.
P.T.C.(pharmacy Therapeutic Committee)

Hospital Formulary system and their organization, functioning, composition.

Drug Information service and Drug Information Bulletin.

Surgical dressing like cotton, gauze, bandages and adhesive tapes including their pharmacopoeial tests for quality. Other hospital supply eg. I.V.sets, B.G. sets, Ryals tubes, Catheters, Syringes etc
.
Application of computers in maintenance of records, inventory control, medication monitoring, drug information and data storage and retrieval in hospital retail pharmacy establishment.

Part II: Clinical Pharmacy:

Introduction to Clinical pharmacy practice- Definition, scope.

Modern dispensing aspects- Pharmacists and patient counseling and advice for the use of common drugs, medication history.

Common daily terminology used in the practice of Medicine.

Disease, manifestation and patho-physiology including salient symptoms to understand the disease like Tuberculosis, Hepatitis, Rheumatoid Arthritis, Cardio-vascular diseases, Epilepsy, Diabetes, Peptic Ulcer, Hypertension.

Physiological parameters with their significance.

Drug Interactions: Definition and introduction. Mechanism of Drug Interaction. Drug-drug interaction with reference to analgesics, diuretics, cardiovascular drugs, Gastro-intestinal agents. Vitamins and Hypoglycemic agents. Drug-food interaction.
Adverse Drug Reaction: Definition and significance. Drug-Induced diseases and Teratogenicity.

Drugs in Clinical Toxicity- Introduction, general treatment of poisoning, systemic antidotes, Treatment of insecticide poisoning, heavy metal poison, Narcotic drugs, Barbiturate, Organo-phosphorus poisons.

Drug dependences, drug abuse, addictive drugs and their treatment, complications.

Bio-availability of drugs, including factors affecting it.

Books Recommended:(Latest editions)
1. Remington's pharmaceutical sciences.
2. Testing of raw materials used in (1).
3. Evaluation of surgical dressings.
4. Sterilization of surgical instruments, glassware and other hospital supplies.
5. Handling and use of data processing equipments.