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Review Article

Heralding a New Era for Higher Education Institutes: Moving Towards Implementation of National Education Policy 2020: A Pharmacy Undergraduate Program Perspective

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ABSTRACT

The National Education Policy (NEP) 2020 has been drafted to bring about a paradigm shift in the prevailing system of education at the school and higher educational levels (Undergraduate and Post graduate Degree programs). The NEP 2020 policy has been designed to ensure that education is reachable to all learners who can avail it at their own pace and according to their needs. Taking academic breaks which was previously unheard of in the Indian education scenario has been made plausible via the NEP 2020. Weightage to the courses taken by the student online and offline is given in the form of credits and each student is recommended to maintain an academic bank of credits account. This article gives an overview of the NEP 2020 policy with respect to higher education with special emphasis to implementation of the undergraduate programs. Recommendation for course structure (as per NEP 2020) for the undergraduate Pharmacy program has been described in detail in comparison with the existing course structure.

Keywords: Pharmacy Course Structure, Pharmacy Council of India, National Education Policy 2020, University Grants Commission, Credits.

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INTRODUCTION

Higher Education Institutes (HEIs) in India play a crucial role in preparing honest and ethical young Indians to have sustained livelihoods and to contribute significantly to the social and economic development of the nation. Higher education must endeavour to create intellectually adept individuals, well-informed about the advancements in the field of their interest/qualification and committed to the welfare of India and her citizens.[1] Further, philosophies of innovation and entrepreneurship should be promoted and promulgated in HEIs to ensure creation of jobs within the country and propel India towards complete self-reliance. The National Education Policy 2020 attempts to bring about reforms in the existing education system in HEIs to achieve the objectives behind its conception.[2]

NEP 2020: Institutional Restructuring and Consolidation

Guidelines for transforming HEIs into multidisciplinary institutions has been prepared in September 2022.[3] NEP 2020 envisages the development of 3 types of multi-disciplinary HEIs by the year 2035; Research intensive Universities (RUs), Teaching-intensive Universities (TUs), Degree-awarding Autonomous Colleges (AC).[3] To develop into a multi-disciplinary HEI, NEP2020 encourages the formation of departments for subjects such as Languages, Literature, Music, Philosophy, Indology, Art, Dance, Theatre, Education, Mathematics, Statistics, Pure and Applied Sciences, Sociology, Economics, Sports, Translation and Interpretation.[3] Further, the policy directs the HEIs to conduct Student-Induction Programmes (SIPs) to create awareness among the student populace about the learning programmes offered and various careers that students can select from.[3] The HEIs are also mandated to register in the Academic Bank of Credit (ABCs) framework and adopt online courses and forge partnerships with other HEIs to offer an interdisciplinary program for graduation.[3] Details on the governance and transformation of the HEIs is given in the Guidelines outlined.[3]

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NEP 2020: Academic Bank of Credits (ABCs)

ABCs is a national level facility designed to offer students flexibility in curriculum, interdisciplinary learning and mobility across HEIs within the country and provide mechanisms of credit transfer. This facility will enable students to customize their education courses and attain their respective degrees (by selecting course options across several higher education disciplines or institutions).[4]

The ABC is an academic service system, a digital/virtual/online entity established and supervised by the MoE/UGC which incorporates students as its account holders. The definitions of some important terms related to this system are laid out in the Gazette of India dated 28th July 2021.[4]

NEP 2020: Multiple Entry and Exit in Academic Programmes

HEIs must offer Undergraduate (UG) programs of either 3-year or 4-year duration with provisions of multiple entry and exit options within the stipulated period. The completion of specified period of study within the three or four-year period should be certified and the students may opt to take a break and resume the course from where they left off.[5,6] The criteria for multiple entry and exit are as given in Table 1.[5,6]

Details of the courses and the minimum credits that must be completed to obtain a UG degree certificate or a UG degree (Honours/Honours with Research) are given in Table 2.[5,6]

UGC: Curriculum and Credit Framework for Undergraduate Programmes

The major and minor core disciplines in an UG program are to be decided by the regulatory authorities in consultation with the respective HEIs.[6] NEP 2020 suggests that the students also undertake courses of multidisciplinary natures, ability enhancement courses, skill enhancement courses, value added courses, summer internships, research project/dissertation as outlined by the UGC.[6] The nature of these courses and credit allotment per UG program are elaborated below Table 2.[6]

Multi/Inter-disciplinary Courses (09 credits)

Students are given a choice of multidisciplinary subjects as part of their program, but they are not allowed to choose or repeat courses that they have taken at the higher secondary (12th class) in major or minor stream.[6] The disciplines from which three courses are to be chosen are suggested by UGC, are as follows.

a. *Natural and Physical Sciences* e.g. Biochemistry, Biotechnology, Botany.[6]

b. *Mathematics, Statistics and Computer Applications* e.g., STATA, SPSS, Python.[6]

c. *Library Information and Media Sciences* e.g. Journalism, mass media and communication.[6]

d. *Commerce and Management* e.g. Business management, accountancy, finance, financial institutions.[6]

e. *Humanities and Social Sciences* e.g. Anthropology, History, Linguistics, Political Sciences, Psychology, Social Work, Sociology, Archaeology, Comparative literature, Arts and Creative Expression, Creative Writing and Literature, Philosophy etc.[6]

Ability Enhancement Courses (AEC) (08 credits)

Modern Indian Language (MIL) and English Language focussed on language and communication skills.[6]

Skill Enhancement Courses (SEC) (09 credits)

Practical Skills,[6] Hands-on Training,[6] Soft skills[6] etc.

Value added courses common for all UG (06-08 credits)

a. *Understanding India*: e.g. Indian Knowledge systems,[6] Indian education system,[6] Indian freedom struggle.[6]

b. *Environmental Science Education*: e.g. Environmental Degradation[6], Climate Change[6]

c. *Digital and Technological Solutions* e.g. Artificial Intelligence, 3D machining, big data analysis, machine learning, drone technologies and deep learning with important applications to health, environment and sustainable living.[6]

d. Health and Wellness,[6] Yoga Education,[6] Sports and Fitness[6]
HEIs have the option of adding other innovative value-added courses besides the ones mentioned above which are relevant to their discipline or program.[6]

Summer Internship/Apprenticeship (02-04 credits)

Students are required to undertake internships/apprenticeships in a firm, industry/organization or undergo training in laboratories with faculty and researchers, in their own HEIs/research institutions during the summer terms.[6] The type of internships that can be opted for, are diverse and could be in local industries, business organizations, health related allied areas, local governments (such as panchayats, municipalities), parliament or elected representatives, media organizations, artists, crafts persons and a wide variety of organizations.[6] The students as interns should engage themselves thoroughly during the internships, such that the experience gained in the training period, improves their chances of employability.[6] The types of internships could be based on :

a. Community engagement and service

The students should be exposed to the society's socio-economic issues so that theoretical learnings can be supplemented by actual experiences and solutions may be generated to these problems.[6]

Table 1: Provisions for student multiple entry and exit during a 3-year/ 4-year programme of study.[6]

Year of exit	Minimum Credit Points to be Earned Before Exit	Vocational Course (Credits to be Completed)	Type of Award on Exit	Re-entry
First Year	40	4 credits in summer vacations of first year.	Certificate	Within 3 years and degree program to be completed within 7 years.
Second Year	80	4 credits in summer vacations of second year.	Diploma	Within 3 years and degree program to be completed within 7 years.
Third Year	120 credits (Refer Table 2)	-	Degree	
Fourth Year	160 credits (Refer Table 2)	-	Honors	
	160 credits including credits in research* (Refer Table 2)	-	Honors with Research	

Table 2: Category of courses for UG (undergraduate) and their credit points as per UGC.[6]

Sl. No.	Broad category of Course	Minimum Credit Requirement for Undergraduate (UG) Program	
		3 year UG	4 year UG
1.	Major (core)	60	80
2.	Minor Stream	24	32
3.	Multidisciplinary (Courses from other disciplines).	09 credits (3 courses)	09 credits (3 courses)
4.	Ability Enhancement Courses (AEC).	08	08
5.	Skill Enhancement Courses (SEC).	09	09
6.	Value added courses common for all UG.	06-08	06-08
7.	Summer Internship	02-04	02-04
8.	Research Project /Dissertation*	-	12
	Total Credits to be Earned	120	160

*Students who have scored 75% in the first six semesters are eligible for carrying out research under a faculty supervisor. Honors students not opting for research will do 3 courses for 12 credits in lieu of research project/dissertation.

This can be part of summer activity or part of a major or minor course depending on major discipline.[6]

b. Field-based learning/minor project

Such projects aim to give students exposure to developmental-related issues in rural and urban settings.[6] Students are thus provided with the opportunity to comprehend regulations, organizational structures, processes and programmes that pilot the nation's development process.[6] This could be a summer term project or part of a major or minor course depending on subject of study.[6]

Research Project/Dissertation (12 credits)

Students who opt for a 4-year Bachelor's degree (Honors with Research) are directed to take up research projects under the mentorship of a faculty member in the 8th semester. The research outcomes of the project work may be published in peer reviewed journals or may be presented in conferences or may be patented.[6]

Pharmacy Education in India: Pharmacy Council of India (PCI)

Pharmacy colleges offering Bachelor of Pharmacy degree across India currently follow the syllabus and regulations laid down by

Table 3: Policies of PCI 2014 vs NEP 2020 recommendations.[5-8]

1. Definition of a credit point	
PCI 2014	**NEP 2020**
Theory- 1 credit=15 hr (12 hr theory+~4 hr tutorial) 4 credits=45 hr theory+15 hr tutorial	Theory- 1 credit=15 hr 4 credits=45 r theory+15 hr tutorial/30 hr practical/lab
Practical- 1 credit~30 hr	Practical/Laboratory (Lab.)- 1 credit=30 hr
2. Number of credits obtained after two semesters/1 year of course	
PCI 2014	**NEP 2020**
Sem I: 27 credit points Sem 2: 29 credit points Total credit points after 1st year: 56	Sem I: 20 credit points Sem II: 20 credit points Total credit points to be earned after 1st year: 36-40 **Level 5**
Sem III: 24 credit points Sem IV: 28 credit points Total credit points after 2nd years: 108	Sem III: 20 credit points Sem IV: 20 credit points Total credit points to be earned after 2nd years: 72-80 **Level 6**
Sem V: 26 credit points Sem VI: 30 credit points Total credit points after 3rd years: 164	Sem V: 20 credit points Sem VI: 20 credit points Total credit points to be earned after 3rd years:108-120 **Level 7**
Sem VII: 24 credit points Sem-VIII: 22 credit points Total credit points after 4th years: 210	Sem VII: 20 credit points Sem VIII: 20 credit points Total credit points to be earned after 4th years: 144-160 **Level 8**
No. of credit points to be obtained for award of degree reduced in NEP2020	
3. Credit Points for Industrial Visits/ Field Visits	
PCI 2014	**NEP 2020**
Credit points not allotted	Credit points allotted. 1 Credit Point: 40-45 hr
4. Credit Points for Industrial Training (Internship)	
PCI 2014	**NEP 2020**
After completion of 3rd year (VI semester) of B.Pharm-Industrial training for 4 weeks (150 hr) is desirable. No credit points are allotted.	Credits for internship shall be 1 credit/week of internship, subject to a maximum of 6 credits. Internship to be done during the V semester.
5. Policy for enrolment in course after premature exit	
PCI 2014	**NEP 2020**
Candidate who seeks re-admission to the program after break of study must get the approval from the university by paying a condonation fee.	The degree program offered for undergraduates should be either of a three-year or four-year duration with multiple entry and exit options within this period.
No condonation is allowed for the candidate who has more than 2 years of break up period and he/she must rejoin the program by paying the required fees.	Students who fulfil the credit requirements sufficient to earn a UG certificate (1 year of program) or UG diploma (2 years of program) and have exited the course, are allowed to re-enter within 3 years and should complete the degree program within the stipulated period of 7 years.
6. Courses Offered for Degree Program	
PCI 2014	**NEP 2020**
Courses for which credits are awarded are categorized into university and non-university graded courses. Credits for Research Project are assigned in the Sem VIII.	Courses for which credits are to be awarded are categorized into Major (core), Minor, Multidisciplinary, Ability Enhancement courses (AEC), Skill advancement courses (SEC), Value added courses, Summer Internship, Research Project/dissertation.
7. Grading of subjects/courses based on difficulty level	
PCI 2014	**NEP 2020**
Courses are not graded.	Grading of courses to be done as follows: Level (0-99): Pre-requisite courses. Level (100-199): Foundation or introductory courses. Level (200-299): Intermediate level courses. Level (300-399): Higher level courses. Level (400-499): Advanced courses. Level (500-599): Courses for 1st year masters program. Level (600-699): Courses for 2nd year masters program. Level (700-799) and above: Courses for doctoral students.

Calculation of SGPA and CGPA similar in PCI 2014 and NEP 2020. Level 5-8 in the Table 3, below the semesters credit point details refers to the attainment level of the student after completion of 1st year, 2nd year, 3rd year and 4th year of the undergraduate program respectively.

the apex body, PCI.[7] These are binding to all colleges that are approved by the PCI. Additions to this existing syllabus are made by the local universities in India and colleges are affiliated to these universities.[8]

The differences and similarities in the policies and regulations of PCI 2014 and the recommendations of NEP 2020 are outlined in Table 3.[6,7,9] The UGC recommended distribution of credits of the undergraduate program, made in accordance with the principles of NEP2020 is given in Table 4.[6,10]

Implementation of NEP 2020 in Pharmacy Education

The previous sections were introduced to give the reader a brief insight into NEP 2020, the desired structure of the NEP 2020 with reference to under-graduate programmes and the differences of NEP 2020 policy with respect to regulations laid by the PCI. The authors will now delve into their suggestions of the NEP 2020-compatible Pharmacy Curriculum, with references to the existing Pharmacy curriculum as per PCI 2014.[8] The outline of the recommendations of the authors in comparison to the PCI existing framework is given in Table 5. In this table, major and minor core courses are suggested. The major courses are maintained as those which are essential and form the backbone of the Pharmacy profession which are specific to Pharmacy. The minor courses are subjects which enhance the comprehension of the major core subjects and which serve to complement the same. But both the major and minor courses are chosen such that the program of Pharmacy is not diluted considering NEP 2020.

DISCUSSION

The NEP2020 came into being on 29th July 2020, endorsed by the Union Cabinet of India. However, due to the COVID pandemic; its implementation has been delayed. We are now in the year 2024-2025 and there is an urgent need for its implementation if we are to reap the benefits of the policy in the years to come. An attempt has been made to highlight the essence of the policy with respect to undergraduate programs. The policy will have to be grasped by HEIs and it is an opportunity for the institutes to introduce multidisciplinary courses in the programs which they conduct. The introduction of interdisciplinary courses will permit students to develop holistic thinking on various perspectives. The policy is student centric since it offers flexibility to students to maintain an academic bank of credits and complete the course in different HEIs. There are provisions available to students to drop out of the UG program in the event of health, financial and family reasons and there is sufficient leniency in time, to re-join the program with appropriate certifications from the HEIs. The courses are to be designed such that there is value addition to the UG program at every academic year and the student is employable after all levels of the program.

The UG Pharmacy certificate program designed (in Table 5) ensures that the student is groomed in a manner by the HEI to be employable in some domains of the Pharmacy profession. The HEI is encouraged to conduct continuing education-based certificate programs which should be open to all candidates including those who have dropped out of the degree program after 1 or 2 years due to financial and circumstantial constraints. The continuing education programs conducted in a flexible hybrid mode (online and offline) and at a nominal fee, will promote life-long learning and provide an opportunity to enhance skills of the candidates, for employability prospects.

In addition, the HEIs are expected to create an innovation-based ecosystem which is in accordance with the objectives of NEP 2020. The establishment and promotion of innovation-based research is imperative with appropriate certifications issued by the HEI. As per guidelines (Tables 1 and 2), students who do not score 75% in the first six semesters, are ineligible for carrying out research under faculty supervisor in the eighth semester and will receive the UG degree (Honors) after completion of 4 years of the course. The authors propose that such students who have not obtained the required percentage but are keen on research may be provided an opportunity in institutional innovation programs. These students should receive appropriate certifications from the institute on completion of the project.

From the Pharmacy educational perspective, in this manuscript, the existing Pharmacy curriculum as per the guidelines laid down by PCI has been considered for possible revisions, especially considering NEP2020. It is further suggested that for fulfilment of the award of UG diploma in Pharmacy, the student should complete one skill-based internship courses of 4 credits in hospital pharmacy or community pharmacy exclusively (after 80 credits). The type of internship for the UG certificate holder of 4 credits (after 40 credits) may not be specific but should be in a hospital or community pharmacy if the candidate wishes to drop out after 2 years to obtain a UG diploma in the Pharmacy Program. This internship along with the revised course structure envisaged (in Table 5) will enable such candidates to be eligible for registration (as a registered Pharmacist) subject to endorsement by regulatory authorities. A minimum of 4 credits, out of the required minimum 120/160 credits, of a 3-year UG degree/4-year UG degree (Honours)/4-year UG degree (Honours with Research) is to be assigned for Internship as per the National Higher Education Qualifications Framework (NHEQF) and Curriculum and Credit Framework for Undergraduate Programme (CCFUP) as per UGC guidelines.[12] The UGC has laid down guidelines for effective assessment of the internships for undergraduate programs.[11,12]

There is a need for exhaustive deliberation and a consensus between various agencies with respect to drafting of course content. There should be a critical scrutiny of the syllabus of the courses to avoid duplication or redundancy while maintaining the connectivity between the courses of the Pharmacy program. Further, there is a need to update the course content to match the national/global requirement. In view of the above and keeping in

Table 4: UGC recommended semester wise distribution of credits for undergraduate programmes.[6,10]

Semester	Discipline Specific Courses-Core	Minor	Inter-disciplinary courses	Ability Enhancement courses (language)	Skill Enhancement courses /Internship/ Dissertation	Common-Value added Courses	Total Credits (Minimum)
I	Level 100-*6 credits*	Level 100-*2 credits*	(1 course)-*3 credits*	(1 course)-*2 credits*	(1 course)-*3 credits*	(1 or 2 courses)*4 credits*	20
II	Level 100-*6 credits*	Level 100-*2 credits*	(1 course)-*3 credits*	(1 course)-*2 credits*	(1 course)-*3 credits*	(1 or 2 courses) *4 credits*	20
	Students exiting the programme after securing 40 credits will be awarded UG certificate in the relevant discipline/subject provided they secure 4 credits in work based vocational courses offered during summer term or internship/apprenticeship in addition to 6 credits from skill-based courses earned during first and second semester.						40
III	Level 200-*8 credits*	Level 200 & above-*4 credits*	(1 course)-3 credits	(1 course)-*2credits*	(1 course)-*3 credits*	-	20
IV	Level 200-*12 credits*	Level 200 & above-*6 credits*	-	(1 course)-*2 credits*	-	-	20
	Students exiting the programme after securing 80 credits will be awarded UG Diploma in the relevant discipline/subject provided they secure additional 4 credits in skill based vocational courses offered during first year or second year summer term.						80
V	Level 300-*10 credits*	Level 200 & above-*6 credits*	-	-	(Internship) *4 credits*	-	20
VI	Level 300-*16 credits* *(Online MOOCs course-6 weeks)[10]-*2 credits*	Level 200 & above-*4 credits*	-	-	-	-	20 (+2*)
	Students who want to undertake 3-year UG programme will be awarded UG degree in the relevant Discipline/Subject upon securing 120 credits.						120
VII	Level 400-*16 credits*	Level 300 & above-*4 credits*					20
VIII	Level 400-*4 credits*	Level 300 & above *-4 credits*			(Research Project/ Dissertation) *12 credits*		20
	Students *opting for research in the 8th Semester* will be awarded UG Degree (Honours) with Research in the relevant Discipline. *UG Degree (Honours) awarded to students who do not opt for research and complete 3 courses of 4 credits each (total 12 credits) instead.*						160

Note: The font in italics (indicating credit points allotted and Online MOOCs) is not part of the original table as documented in (University Grants Commission: Curriculum and Credit Framework for Undergraduate Programme)[6] but has been incorporated as per the understanding of the authors. The term "Level" in this table indicates the difficulty level of the subjects/courses offered under major (discipline specific/core) and minor headings. Please refer Table 3 for the description of the difficulty levels.

Table 5: PCI 2014 framework Vs Recommendations by authors for implementation of NEP2020 to Pharmacy.[6,8]

Semester	PCI 2014 Curriculum	Authors Recommendations in accordance with NEP2020 for Pharmacy Education with reference to PCI 2014.
I	Theory Human Anatomy and Physiology-I-*4 credits* Pharmaceutical Analysis-I-*4credits* Pharmaceutical Inorganic Chemistry-*4 credits* Pharmaceutics-I-4 credits *Remedial Biology/Remedial Maths-*2 credits* **Communication Skills-*2 credits* Practical/Laboratory (Lab.) Human Anatomy and Physiology-I-*2 credits* Pharmaceutical Analysis-I-*2 credits* Pharmaceutical Inorganic Chemistry-*2 credits* Pharmaceutics-I-2 credits **Communication skills-*1 credit* *Remedial Biology-*1 credit* **Total Credits: 27/28/30** *** Optional** **** Non-University subject**	Major Core: (6 credits) Pharmaceutics-I-Theory 45 hr-*3 credits* Pharmaceutics-I-Lab 30 hr-*1 credit* Pharmaceutical Inorganic Chemistry Theory 15 hr-*1 credit* Pharmaceutical Inorganic Chemistry Lab 30 hr-*1 credit* Minor Core: (2 credits) Human Anatomy and Physiology Theory (30 hr)-*2 credits* Interdisciplinary Course: (3 credits) Accountancy-15 hr Theory-1credit Business Management-Theory 30 hr-*2 credits* Ability Enhancement Course: (2 credits) Communication skills-30 hr Theory-*2 credits* Skill Enhancement Courses-(3 credits) Human Anatomy and Physiology-I Lab 30 hr-*1 credit* Cosmetics Lab 30 hr-*1 credit* Computer skills-Word/Excel/PPT-Lab-30 hr-*1 credit* Value added courses-4 credits Environment and Sustainable Living-Theory 30 hr-*2 credits* Yoga Education-Theory 30h-*2 credits* **Total: 20 credits**
II	Theory Human Anatomy and Physiology-II-*4 credits* Pharmaceutical Organic Chemistry-I-*4 credits* Biochemistry-4 credits Pathophysiology-4 credits **Computer Applications in Pharmacy-*3 credits* **Environmental Sciences-*3 credits* Practical/Laboratory Human Anatomy and Physiology-II-*2 credits* Pharmaceutical Organic Chemistry-I-*2 credits* Biochemistry-2 credits **Computer Applications in Pharmacy-*1 credit* **Total: 29 credits** **** Non-University Subjects**	Major core: 6 credits Pharmaceutical Organic Chemistry-Theory 45 hr-*3 credits* Pharmaceutical Organic Chemistry-Lab 30 hr-*1 credit* Pharmaceutical Analysis Theory 30 hr-2 *credits* Minor Core: 2 credits Human Anatomy and Physiology-II-Theory 30 hr-*2 credits* Interdisciplinary Course: (3 credits) Hospital and Community Pharmacy-Theory 30 hr-*2 credits* Hospital and Community Pharmacy-Lab-30 hr-1 *credit* Ability Enhancement Course: (2 credits) Medical Writing-Theory 30 hr-*2 credits* Skill Enhancement Courses (3 credits) Computer Applications in Pharmacy-Lab30 hr-*1credit* Human Anatomy and Physiology-II-Lab 30 hr-1 *credit* Pharmaceutical Analysis Lab-30h -*1 credit* Value Added Courses (4 credits) Science of Nutrition-Theory 30 hr-*2 credits* Indian system of medicine-Theory 30 hr-*2 credits* **Total: 20 credits**

Semester	PCI 2014 Curriculum	Authors Recommendations in accordance with NEP2020 for Pharmacy Education with reference to PCI 2014.
III	Theory Pharmaceutical Organic Chemistry II-*4 credits* Physical Pharmaceutics-I-*4 credits* Pharmaceutical Microbiology-*4 credits* Pharmaceutical Engineering-*4 credits* Practical/Laboratory Pharmaceutical Organic Chem II-*2 credits* Physical Pharmaceutics-I-*2 credits* Pharmaceutical Microbiology-*2 credits* Pharmaceutical Engineering-*2 credits* **Total-24 credits**	Major Core: 8 credits Pharmaceutical Microbiology-Theory 45 hr-3 *credits* Pathophysiology-45 hr Theory-3 *credits* Pharmacotherapeutics-Theory 30 hr-*2 credits* Minor: 4 credits Biochemistry (Theory-45 hr+15 hr Tutorial)-4 *credits* Interdisciplinary Course (3 credits) Pharmaceutical Engineering-Theory 45 hr-*3 credits* Ability Enhancement Courses (2 credits) Drug Store Management-Theory 30 hr-*2 credits* Skill Enhancement Courses (3 credits) Hands on training in Pharmaceutical Microbiology Techniques-Lab 45 hr-*1.5 credits* Hands on Training in Biochemistry Techniques-Lab 45 hr-*1.5 credits* **Total-20 credits**
IV	Theory Pharmaceutical Organic Chemistry-III-*4 credits* Medicinal Chemistry-I-*4 credits* Physical Pharmaceutics-II-*4 credits* Pharmacology-I-4 credits Pharmacognosy and Phytochemistry-I-*4 credits* Practical/Laboratory Medicinal Chemistry-I-2 credits Physical Pharmaceutics-II-2 credits Pharmacology-I-2 credits Pharmacognosy and Phytochemistry-I-2 credits **Total: 28 credits**	Major Core (12 credits) Pharmacology-I-(Theory 45 hr + Lab 30 hr) *-4 credits* Physical Pharmaceutics-I (Theory 45 hr +Lab 30 hr)-*4 credits* Medicinal Chemistry-I-(Theory 45 hr + Lab 30 hr)-*4credits* Minor (6 credits) Pharmacognosy and Phytochemistry-I Theory 45 hr + Lab 30 hr-*4 credits* Pharmaceutical Jurisprudence -Theory 30 hr-*2 credits* Ability Enhancement Courses (2 credits) Introduction to Digital Marketing-Theory 30 hr-*2credits* **Total-20 credits**
V	Theory Medicinal Chemistry-II-4 credits Industrial Pharmacy-I-4 credits Pharmacology-II-4 credits Pharmacognosy and Phytochemistry-II-4credits Pharmaceutical Jurisprudence-4 credits Practical/Laboratory Industrial Pharmacy-I-2 credits Pharmacology II-2 credits Pharmacognosy and Phytochemistry-II-2credits **Total Credits :26**	Major Core (10 credits) Pharmacology II-(30 hr Theory+30 hr Lab.)-3 *credits* Pharmaceutical Organic Chemistry-II-(45 hr theory+30 hr Lab.)-*4 credits* Industrial Pharmacy I-(30 hr+30 hr Lab)-3 *credits* Minor Core (6 credits) Pharmacognosy and Phytochemistry-II-(Theory 30 hr + 30hr Lab)- *3 credits* Physical Pharmaceutics-II-(Theory 30 hr +Lab 30 hr) *3 credits* Internship (4 credits) 4 weeks training **Total credits: 20 credits**

Semester	PCI 2014 Curriculum	Authors Recommendations in accordance with NEP2020 for Pharmacy Education with reference to PCI 2014.
VI	Theory i.Medicinal Chemistry-III-4 credits Pharmacology-III-4 credits Herbal Drug technology-4 credits Biopharmaceutics and Pharmacokinetics-4 credits Pharmaceutical Biotechnology-4 credits Practical/Laboratory Medicinal Chemistry-III-*2 credits* Pharmacology III-*2 credits* Herbal Drug Technology-*2 credits* **Total Credits: 26**	Major core (16 credits+2 credits-Online MOOCs) Biopharmaceutics and Pharmacokinetics (Theory 45 hr+15 hr tutorial)-*4 credits* Pharmaceutical Organic Chemistry-III (Theory 45 hr+Lab.30 hr)-*4 credits* Medicinal Chemistry-II (Theory 45 hr+Lab. 30 hr)-*4 credits* Pharmacology-III-(Theory 45 hr theory+Lab. 30 hr)-*4 credits* Any Online course-MOOCs platform pertaining to Pharmacy Advancement courses-6 weeks-*2 credits* Minor core (4 credits) Herbal Drug Technology (Theory 45 hr+Lab. 30 hr)-*4 credits* **Total Credits: 20+2**
VII	Theory Instrumental Methods of Analysis-*4 credits* Industrial Pharmacy-II-*4 credits* Pharmacy Practice II-*4 credits* Novel Drug Delivery System-*4 credits* Practical/Laboratory Instrumental Methods of Analysis-*2 credits* Practice School-*6 credits* **Total credits: 24**	Major Core (16 credits) Pharmaceutical Biotechnology (45 hr theory+30 hr Lab.)-*4 credits* Medicinal Chemistry III (45 hr theory+30 hr Lab.)-*4 credits* Instrumental Methods of Analysis (45 hr theory+30 hr Lab.)-*4 credits* Novel Drug Delivery System (45 hr theory+30 hr Lab.)-*4 credits* Minor Core (4 credits) Industrial Pharmacy-II-Theory-30 hr-*2 credits* Pharmacy Practice-Theory-30 hr-*2 credits* **Total Credits: 20**
VIII	Theory Biostatistics and Research Methodology-*4 credits* Social and Preventive Pharmacy-*4 credits* Electives: Any two-Theory (4 credits+4 credits) Pharma Marketing Management Pharmaceutical Regulatory Design Pharmacovigilance Quality Control and Standardization of Herbals Computer Aided Design Cell and Molecular Biology Cosmetic Science Experimental Pharmacology Advanced Instrumentation Techniques Dietary Supplements and Nutraceuticals Project work: 6 credits **Total Credits: 22**	Major Core (4 credits) Biostatistics and Research Methodology-(45 hr theory+15 hr tutorial)-*4 credits* Minor Core (4 credits) Social and Preventive Pharmacy (Theory 45 hr+15 hr tutorial)-*4 credits* Honours with Research: Research Project /Dissertation: (12 credits) OR Honours: Any 3 courses (4 credits each):-12 credits Pharma Marketing Management Pharmaceutical Regulatory Design Pharmacovigilance Quality Control and Standardization of Herbals Computer Aided Design Cell and Molecular Biology Cosmetic Science Experimental Pharmacology Dietary Supplements and Nutraceuticals Advanced Instrumentation Techniques Innovation and Entrepreneurship **Total Credits: 20**

NEP2020 in perspective, the PCI syllabus of Pharmacy program needs to be revisited. The PCI course structure, amended/revised in accordance with NEP2020 will make the program more aligned to the future challenges. The views expressed and amendments proposed in this manuscript are based on authors understanding.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

ABCs: Academic Bank of Credits; **AC:** Autonomous College; **CGPA:** Cumulative Grade Point Average; **CCFUP:** Curriculum and Credit Framework for Undergraduate Programme; **HEI:** Higher Education Institute; **MIL:** Modern Indian Language; **MoE:** Ministry of Education; **NEP 2020:** National Education Policy 2020; **NHEQF:** National Higher Education Qualifications Framework; **PCI:** Pharmacy Council of India; **PG:** Postgraduate; **RUs:** Research Intensive Universities; **SGPA:** Semester Grade Point Average; **SIPs:** Student Induction Programmes; **SPSS:** Statistical Package for the Social Sciences; **TUs:** Teaching Intensive Universities; **UG:** Undergraduate; **UGC:** University Grants Commission.

SUMMARY

In this manuscript NEP2020 and the UGC guidelines for UG programs have been highlighted for their implementation in HEIs. In the near future, the Pharmacy program will also have to be restructured to adapt to NEP2020. The authors have proposed an outline of a revised Pharmacy program to align with the NEP2020 and UGC guidelines, with reference to the current PCI Pharmacy program framework.

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