



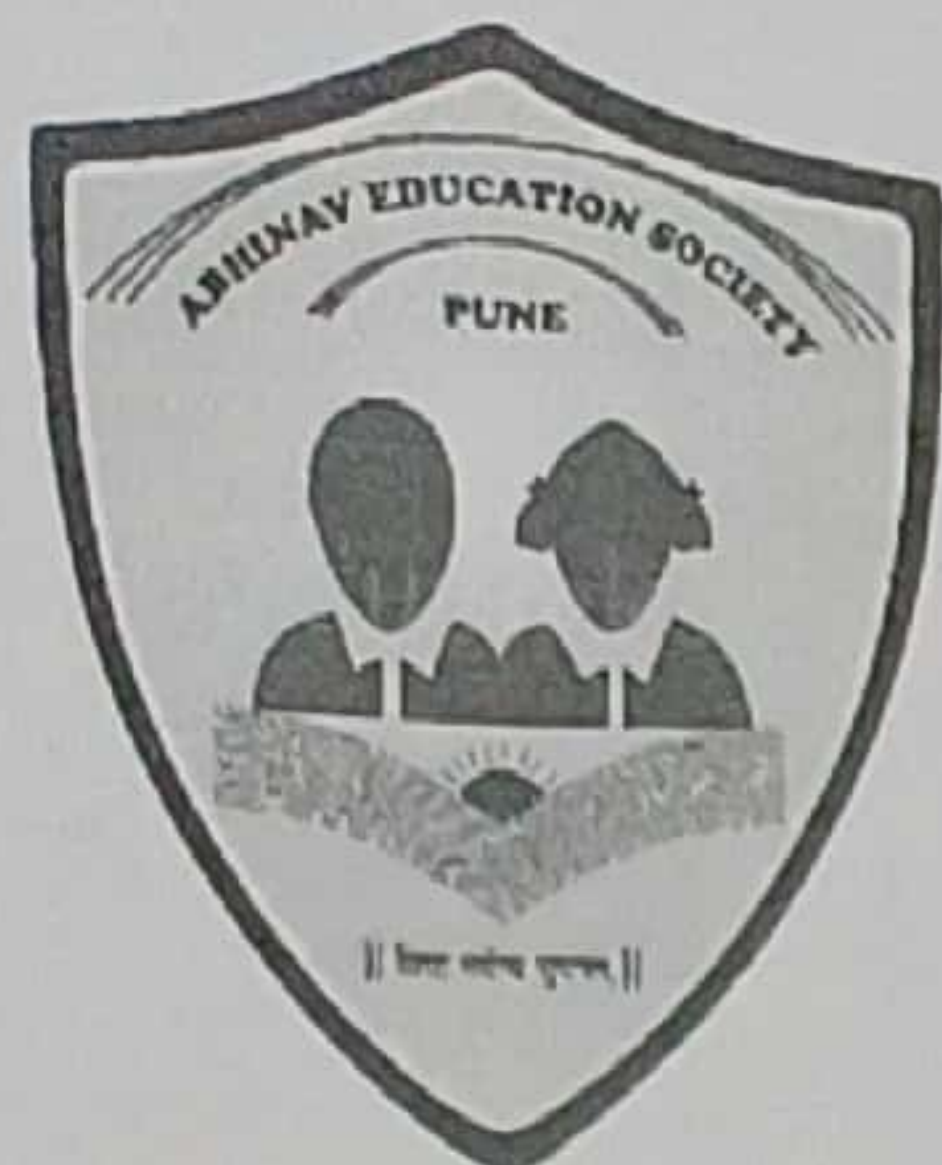
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College of Pharmacy (B. Pharm), Narhe, Pune-41.



2.6.1

**PROGRAMME
OUTCOMES (POs)**



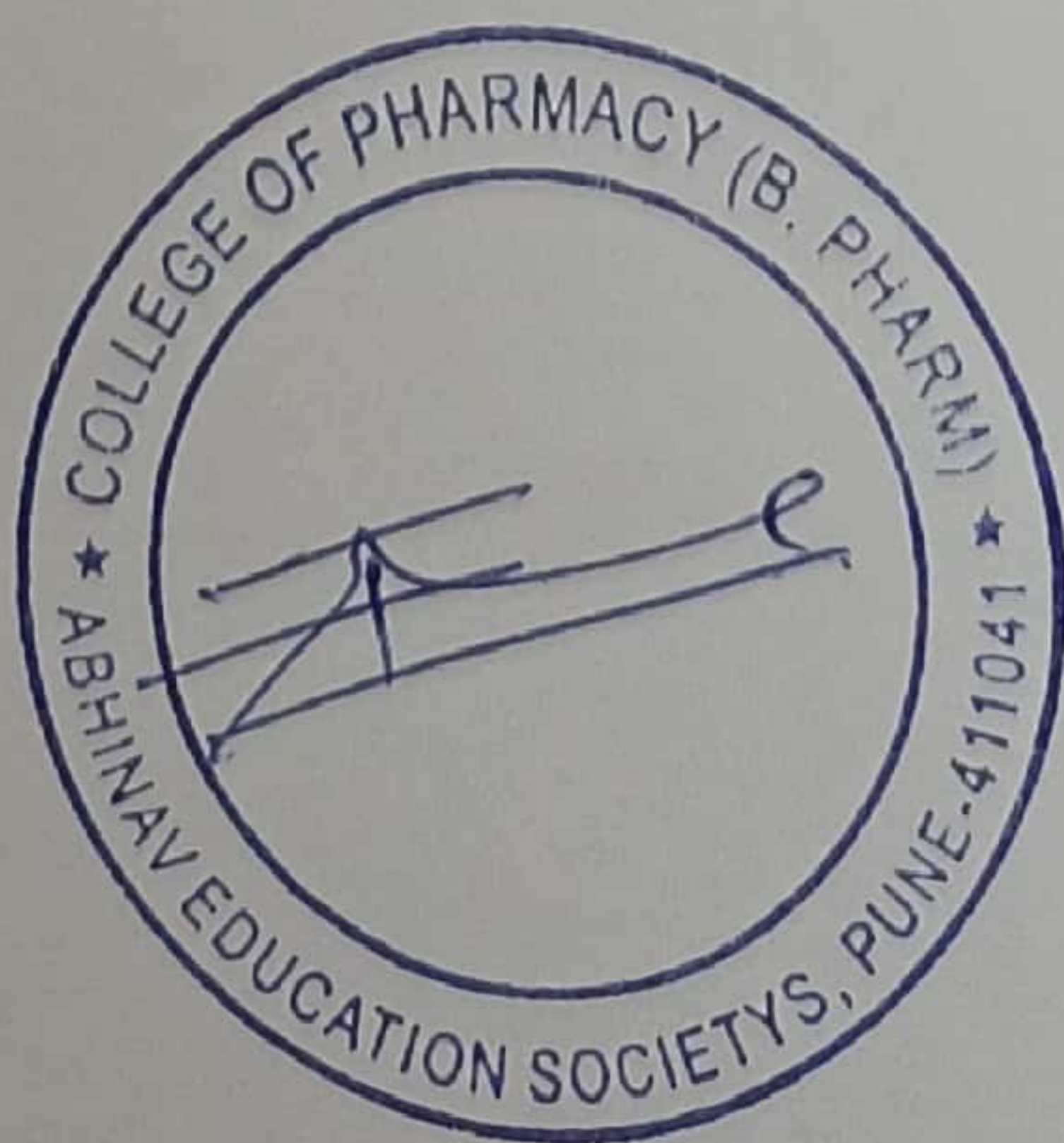
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PROGRAM OUTCOMES

- 1. Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.
- 2. Planning Abilities:** Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.
- 3. Problem analysis:** Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
- 4. Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
- 5. Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.
- 6. Professional Identity:** Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
- 7. Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
- 8. Communication:** Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
- 9. The Pharmacist and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.
- 10. Environment and sustainability:** Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- 11. Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self access and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.





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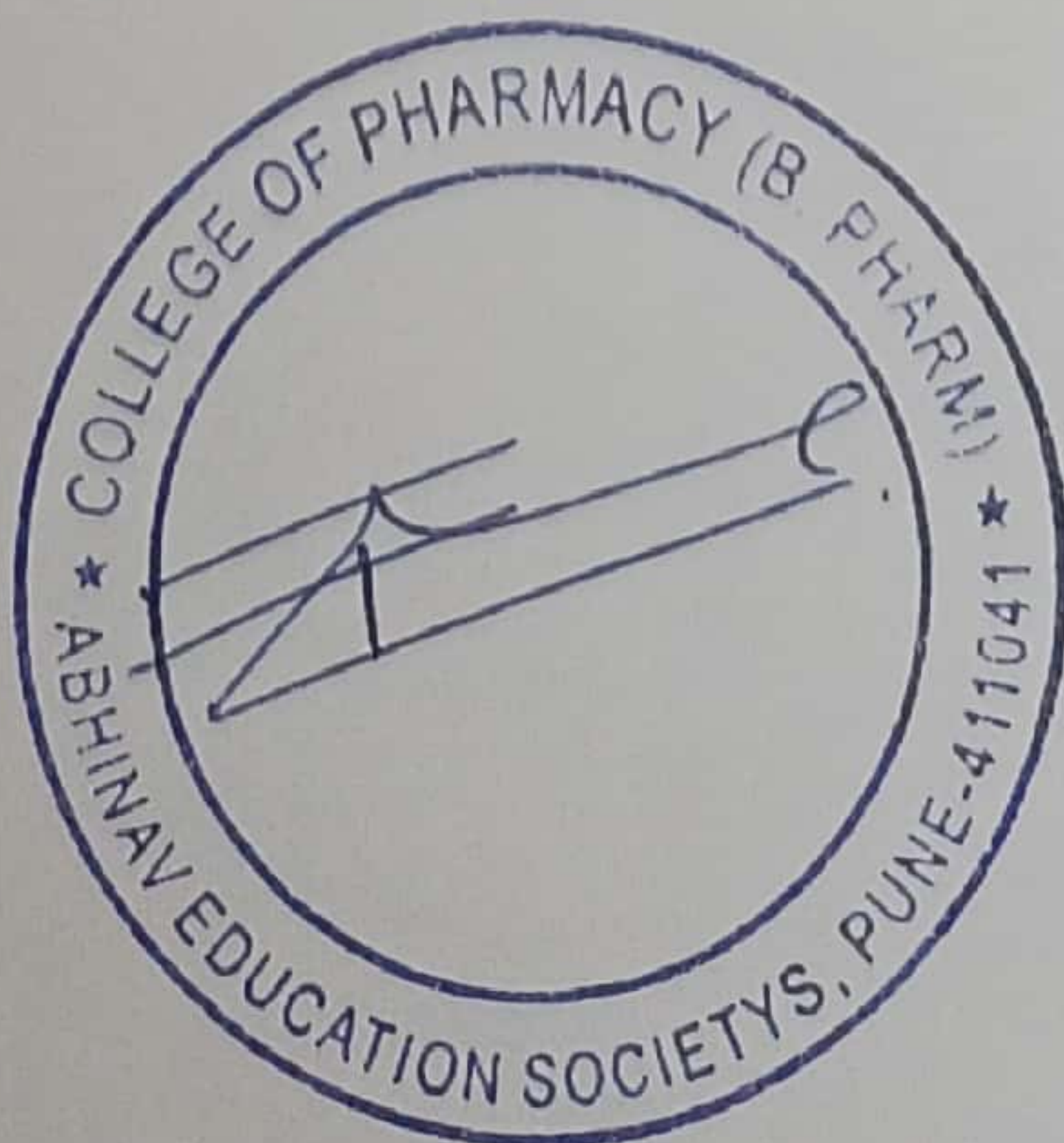
COURSE OUTCOMES

(COs)



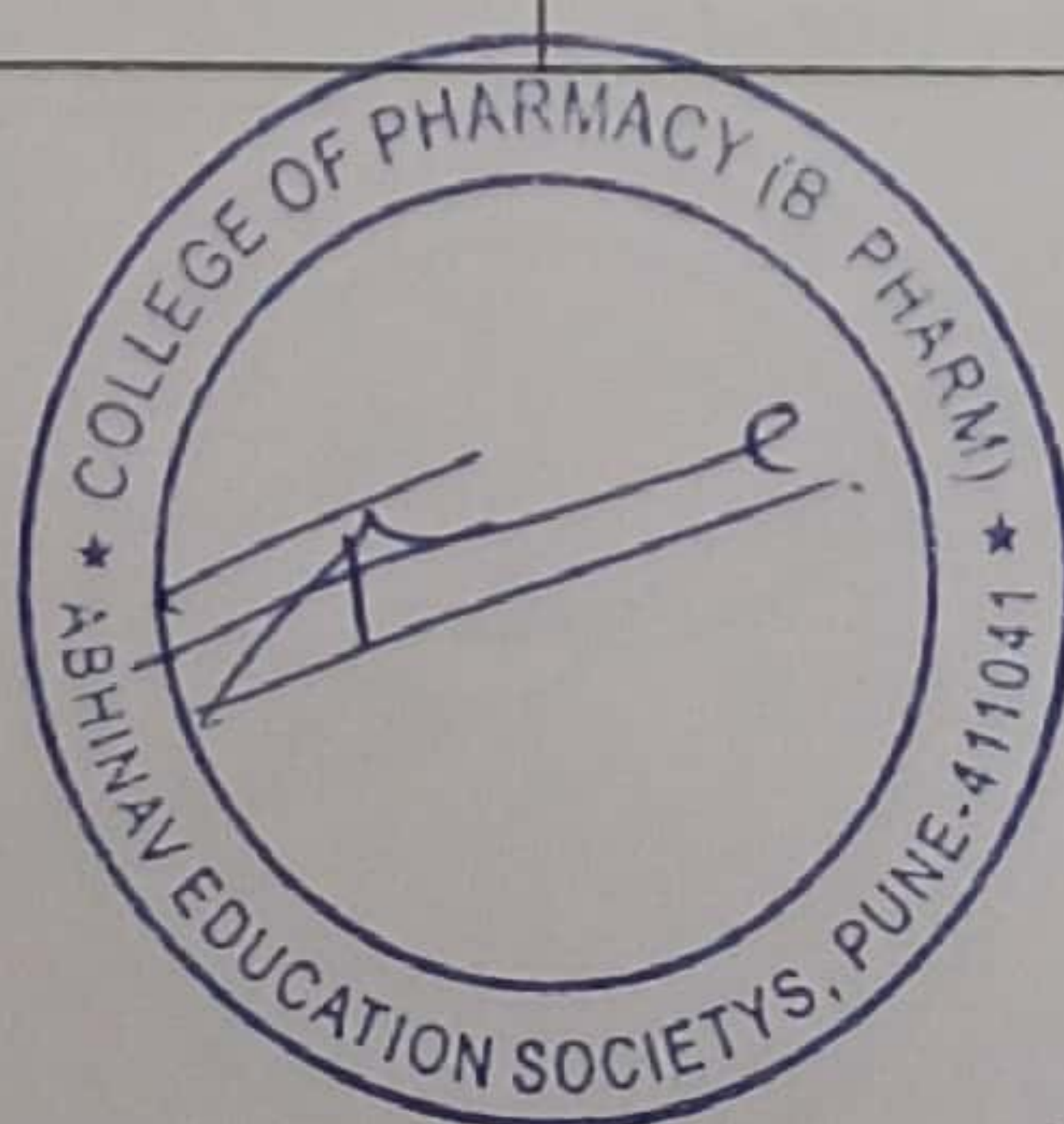
COURSE OUTCOMES FOR B.PHARM

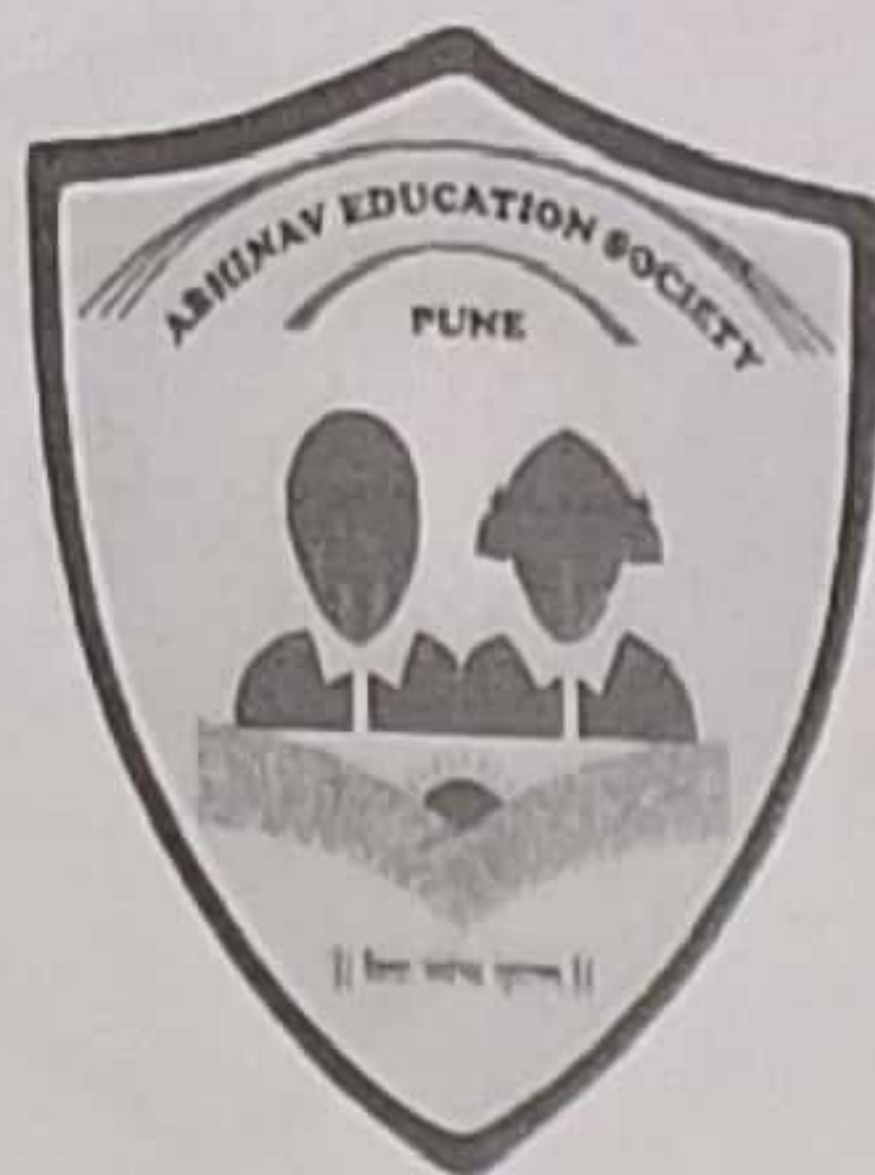
Sr. No	Year & Sem	Subject Name	Subject Code	Course Outcomes
1	First Year Sem I	Human Anatomy and Physiology I-Theory & Practical	BP10 1T & BP10 7P	1. Explain the gross morphology, structure and functions of various organs of the human body. 2. Describe the various homeostatic mechanisms and their imbalances. 3. Identify the various tissues and organs of different systems of human body. 4. Perform the various experiments related to special senses and nervous system. 5. Appreciate coordinated working pattern of different organs of each.
2		Pharmaceutical Analysis I - Theory & Practical	BP10 2T & BP10 8P	1. understand the principles of volumetric and electro chemical analysis 2. carryout various volumetric and electrochemical titrations 3. develop analytical skills
3		Pharmaceutics I - Theory & Practical	BP10 3T & BP10 9P	1. Know the history of profession of pharmacy 2. Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations 3. Understand the professional way of handling the prescription 4. Preparation of various conventional dosage forms
4		Pharmaceutical Inorganic Chemistry - Theory & Practical	BP10 4T & BP11 0P	1. know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals 2. understand the medicinal and pharmaceutical importance of inorganic compounds
5		Communication skills - Theory & Practical *	BP10 5T & BP11 1P	1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation 2. Communicate effectively (Verbal and Non Verbal) 3. Effectively manage the team as a team player



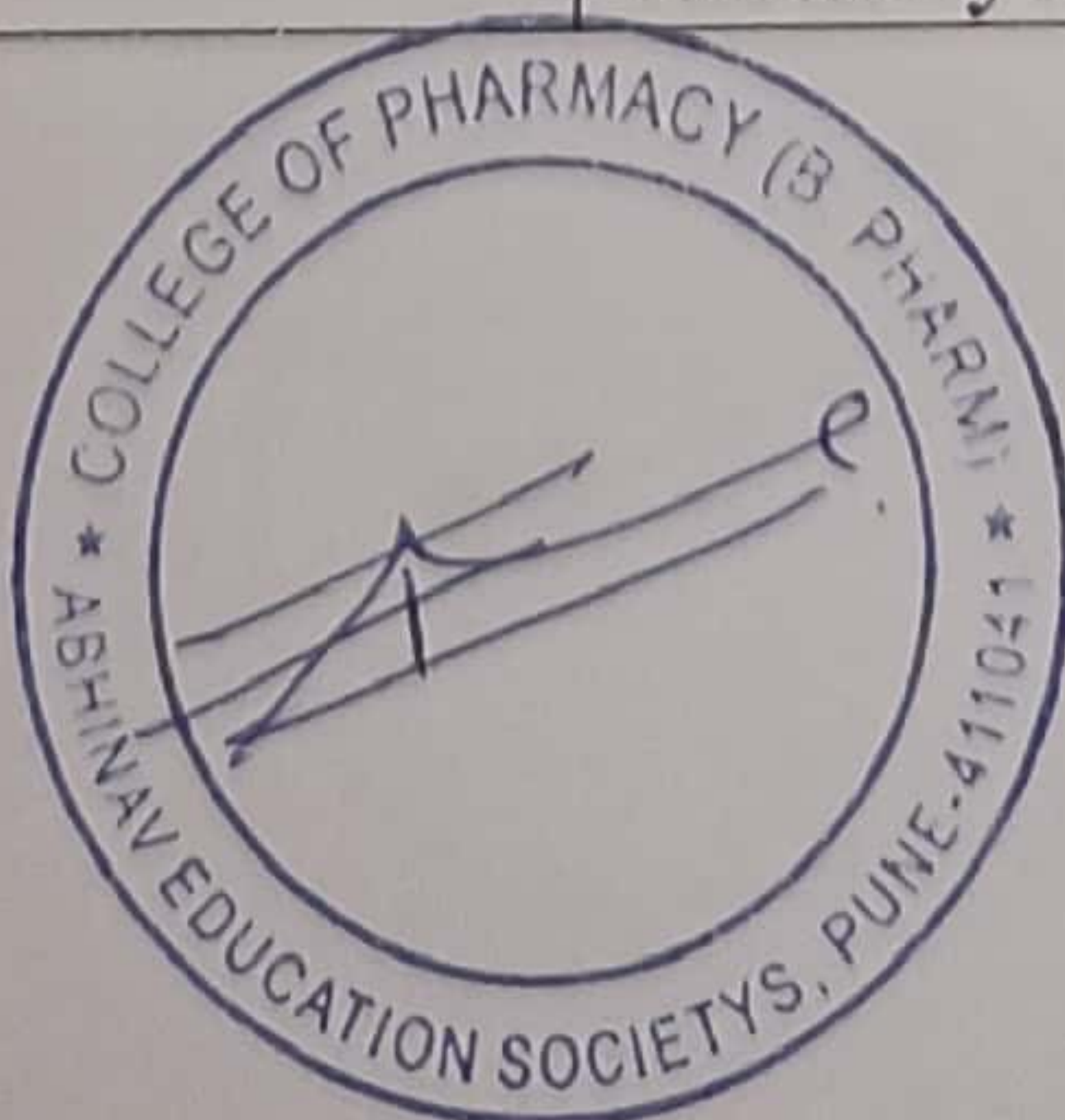


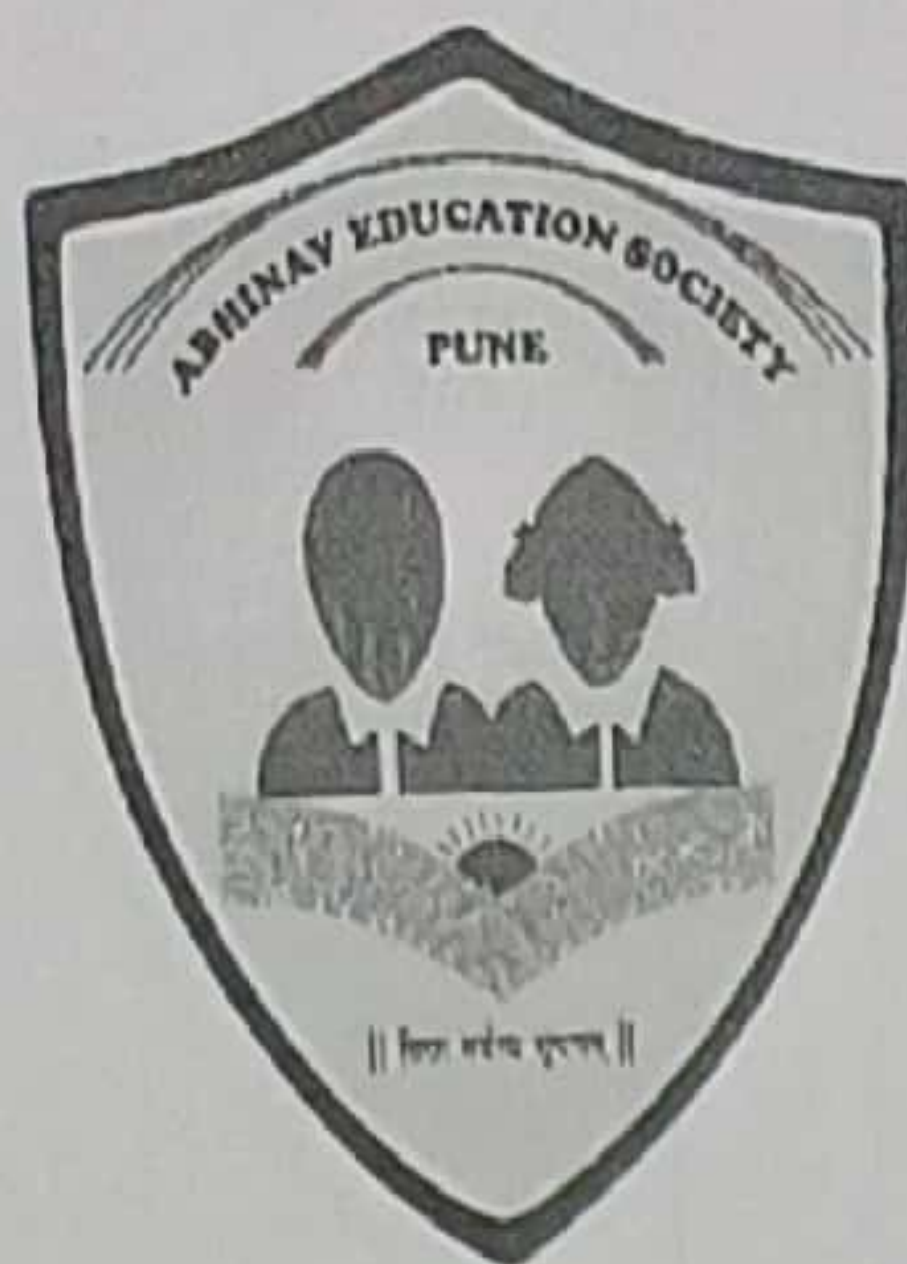
				4.Develop interview skills 5.Develop Leadership qualities and essentials
6		Remedial Biology- Theory & Practical *	BP1 06R BT & BP1 12	1.know the classification and salient features of five kingdoms of life 2.understand the basic components of anatomy & physiology of plant 3.know understand the basic components of anatomy & physiology animal withspecial reference to human
7		Remedial Mathematics Theory	RBP BP10 6RM T	1.Know the theory and their application in Pharmacy 2.Solve the different types of problems by applying theory 3.Appreciate the important application of mathematics in Pharmacy
8	First Year Sem II	Human Anatomy and Physiology II	BP201T BP207P – Theory	1.Explain the gross morphology, structure and functions of various organs of thehuman body. 2.Describe the various homeostatic mechanisms and their imbalances. 3.Identify the various tissues and organs of different systems of human body. 4.Perform the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume. 5.Appreciate coordinated working pattern of different organs of each system 6.Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.
9		Pharmaceutical Organic Chemistry I –	BP202T BP208P	1. Write the structure, name and the type of isomerism of the organic compound



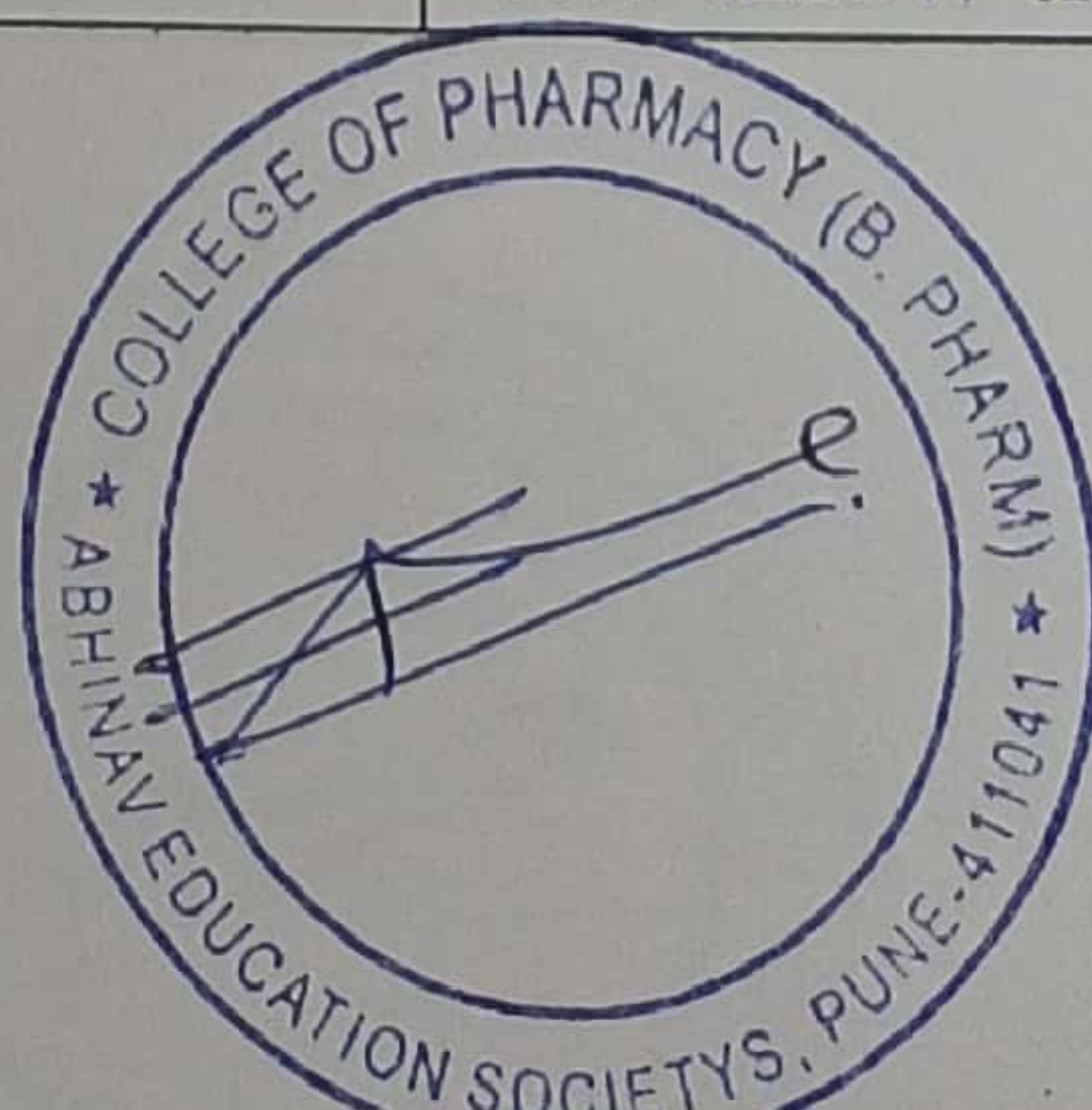


		Theory		2. Write the reaction, name the reaction and orientation of reactions 3. Account for reactivity/stability of compounds, 4. Identify/confirm the identification of organic compound
10		Biochemistry Theory	BP203T BP209P	1. Upon completion of the course student shall be able to understand the catalytic role of enzymes, 2. Importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes, metabolism of nutrient molecules in physiological and pathological conditions, genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins, 3. Qualitative and quantitative analysis of biochemical constituents of blood and urine.
11		Pathophysiology – Theory	BP204T	1. Describe the etiology and pathogenesis of the selected disease states; 2. Name the signs and symptoms of the diseases; and 3. Mention the complications of the diseases.
12		Computer Applications in Pharmacy Theory *	BP205T & BP210P	1. know the various types of application of computers in pharmacy 2. know the various types of databases 3. know the various applications of databases in pharmacy
13		Environmental sciences – Theory *	BP206T	1. Create the awareness about environmental problems among learners. 2. Impart basic knowledge about the environment and its allied problems. 3. Develop an attitude of concern for the environment. 4. Motivate learner to participate in environment protection and environment improvement. 5. Acquire skills to help the concerned individuals in identifying and solving



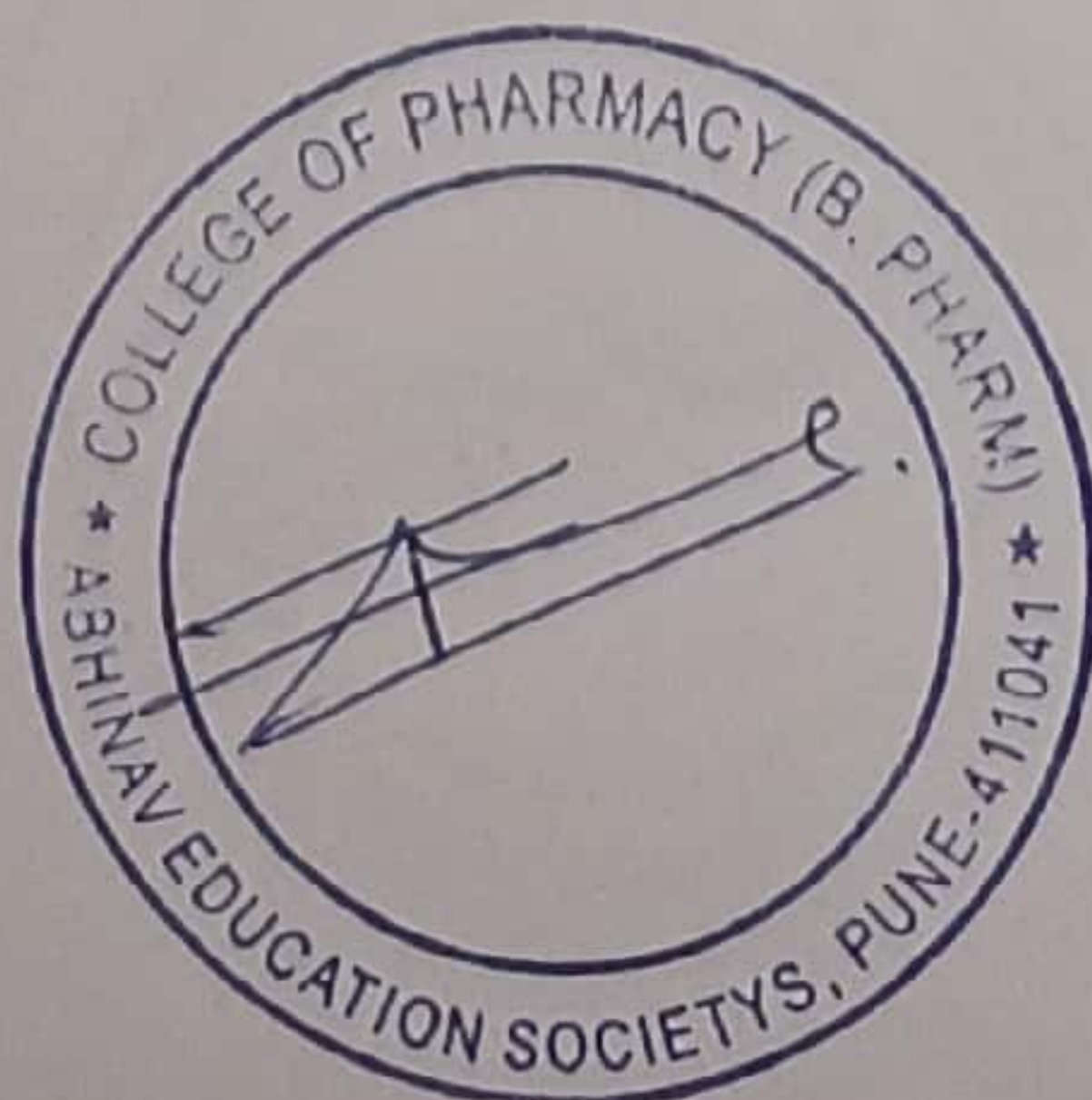


	IV	Theory		application. Write the mechanisms of named reactions and apply while synthesizing new chemical entities. 3. Discuss the concept of Stereochemistry and its importance in medicine.
19		Medicinal Chemistry I – Theory	BP402T & BP406P	1. understand the chemistry of drugs with respect to their pharmacological activity 2. understand the drug metabolic pathways, adverse effect and therapeutic value of drugs 3. know the Structural Activity Relationship (SAR) of different class of drugs 4. write the chemical synthesis of some drugs
20		Physical Pharmaceutics II – Theory	BP403T & BP407P	1. Understand various physicochemical properties of drug molecules in the designing the dosage forms 2. Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations 3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.
21		Pharmacology I – Theory	BP404T & BP408P	1. Understand the pharmacological actions of different categories of drugs 2. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels. 3. Apply the basic pharmacological knowledge in the prevention and treatment of various diseases. 4. Observe the effect of drugs on animals by simulated experiments 5. Appreciate correlation of pharmacology with other bio medical sciences
22		Pharmacognosy	BP405T	1. to know the techniques in the cultivation and





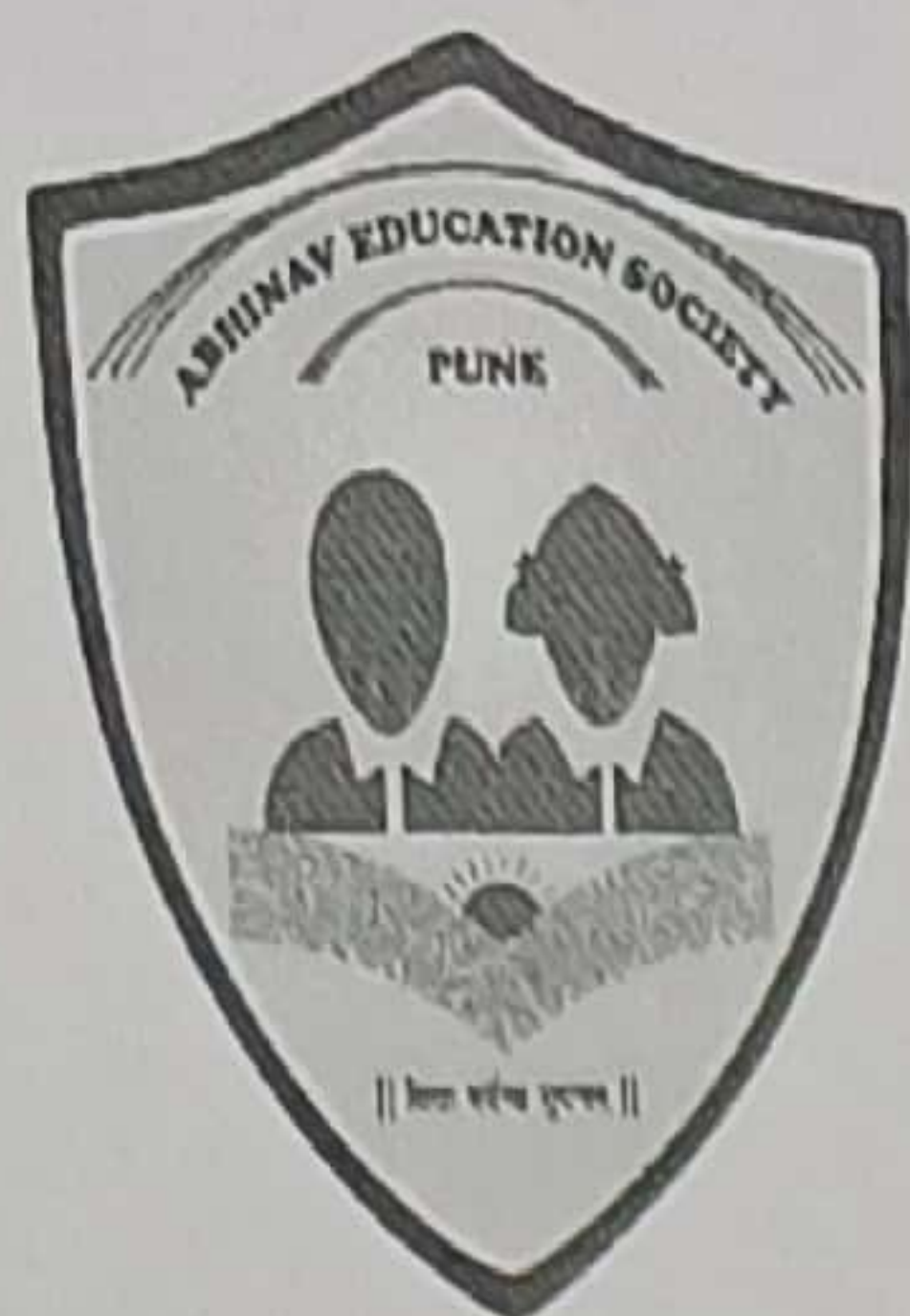
		and Phytochemistry I– Theory	BP409P	production of crude drugs 2. to know the crude drugs, their uses and chemical nature 3.know the evaluation techniques for the herbal drugs 4.to carry out the microscopic and morphological evaluation of crude drugs
23	Third Year Sem V	Medicinal Chemistry II – Theory	BP501T	1.Understand the chemistry of drugs with respect to their pharmacological activity 2.Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs 3.Know the Structural Activity Relationship of different class of drugs 4.Study the chemical synthesis of selected drugs
24		Industrial Pharmacy I– Theory & Practical	BP502T & BP506P	1.Know the various pharmaceutical dosage forms and their manufacturing techniques. 2.Know various considerations in development of pharmaceutical dosage forms 3.Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality
25		Pharmacology II – Theory & Practical	BP503T & BP507P	1.Understand the pharmacodynamics and their application in the pharmacotherapy of various drugs used in the treatment of cardiovascular, endocrine disorders. 2.Know the experimental techniques and models used for the pharmacological study of drugs
26		Pharmacognosy and Phytochemistry II– Theory & Practical	BP504T BP508P	1.Gain knowledge of how the secondary metabolites are produced in the crude drugs, 2.How to isolate and identify and produce them industrially, producing the plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional system of medicine





27		Pharmaceutical Jurisprudence – Theory	BP505T	<ol style="list-style-type: none">1.The Pharmaceutical legislations and their implications in the development andmarketing of pharmaceuticals.2.Various Indian pharmaceutical Acts and Laws3.The regulatory authorities and agencies governing the manufacture and sale ofpharmaceuticals4.The code of ethics during the pharmaceutical practice
28	Third Year Sem VI	Medicinal Chemistry III – Theory Practical	BP601T & BP607P	<ol style="list-style-type: none">1.Understand the importance of drug design and different techniques of drugdesign.2.Understand the chemistry of drugs with respect to their biological activity.3.Know the metabolism, adverse effects and therapeutic value of drugs.4.Know the importance of SAR of drugs.
29		Pharmacology III – Theory & Practical	BP602T & BP608P	<ol style="list-style-type: none">1.understand the mechanism of drug action and its relevance in the treatment ofdifferent infectious diseases2.comprehend the principles of toxicology and treatment of various poisoningsand3.appreciate correlation of pharmacology with related medical sciences.
30		Herbal Drug Technology – Theory Practical	BP603T & BP609P	<ol style="list-style-type: none">1.understand raw material as source of herbal drugs from cultivation to herbal drugproduct2.know the WHO and ICH guidelines for evaluation of herbal drugs3.know the herbal cosmetics, natural sweeteners, nutraceuticals4.appreciate patenting of herbal drugs, GMP .



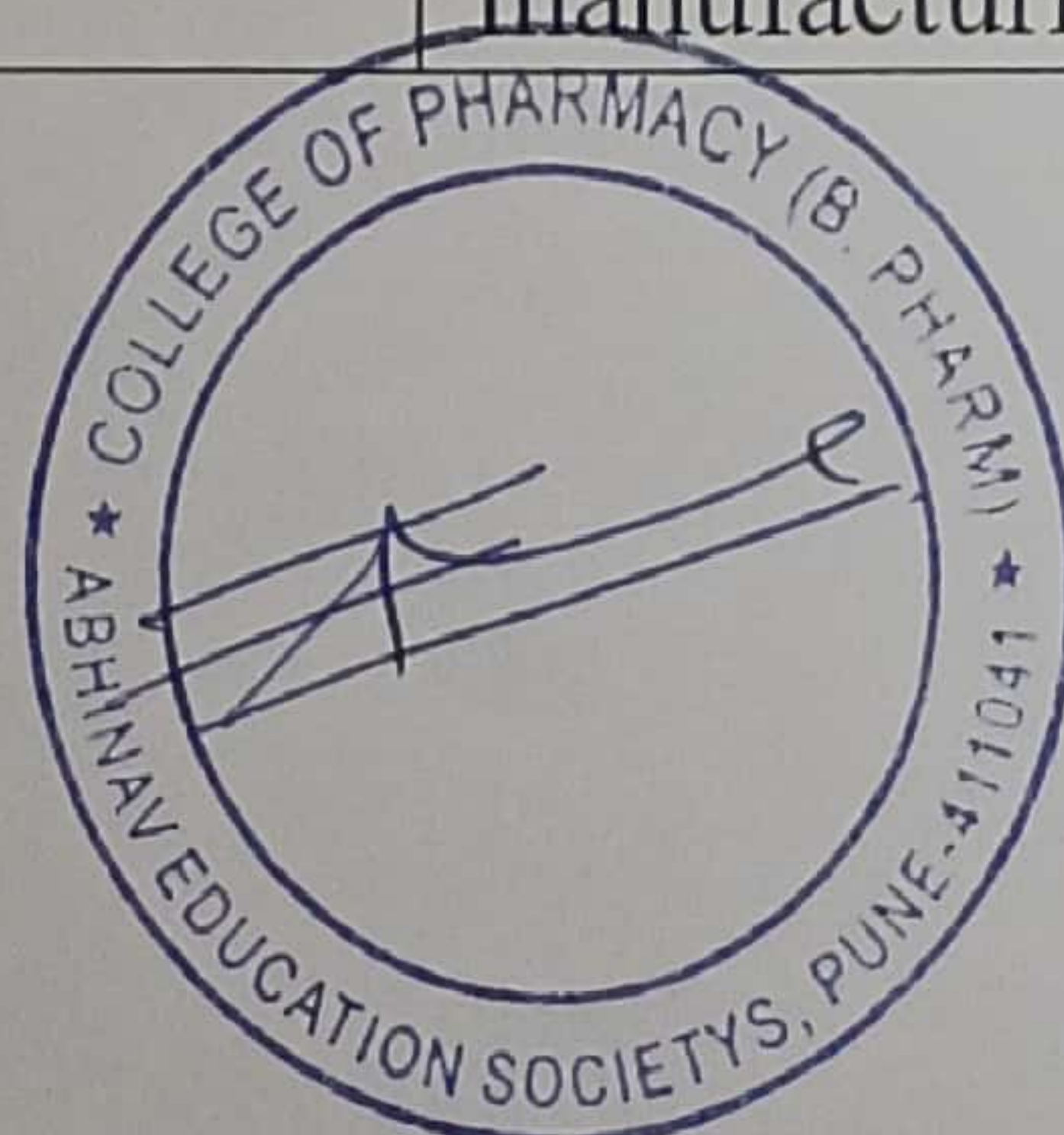


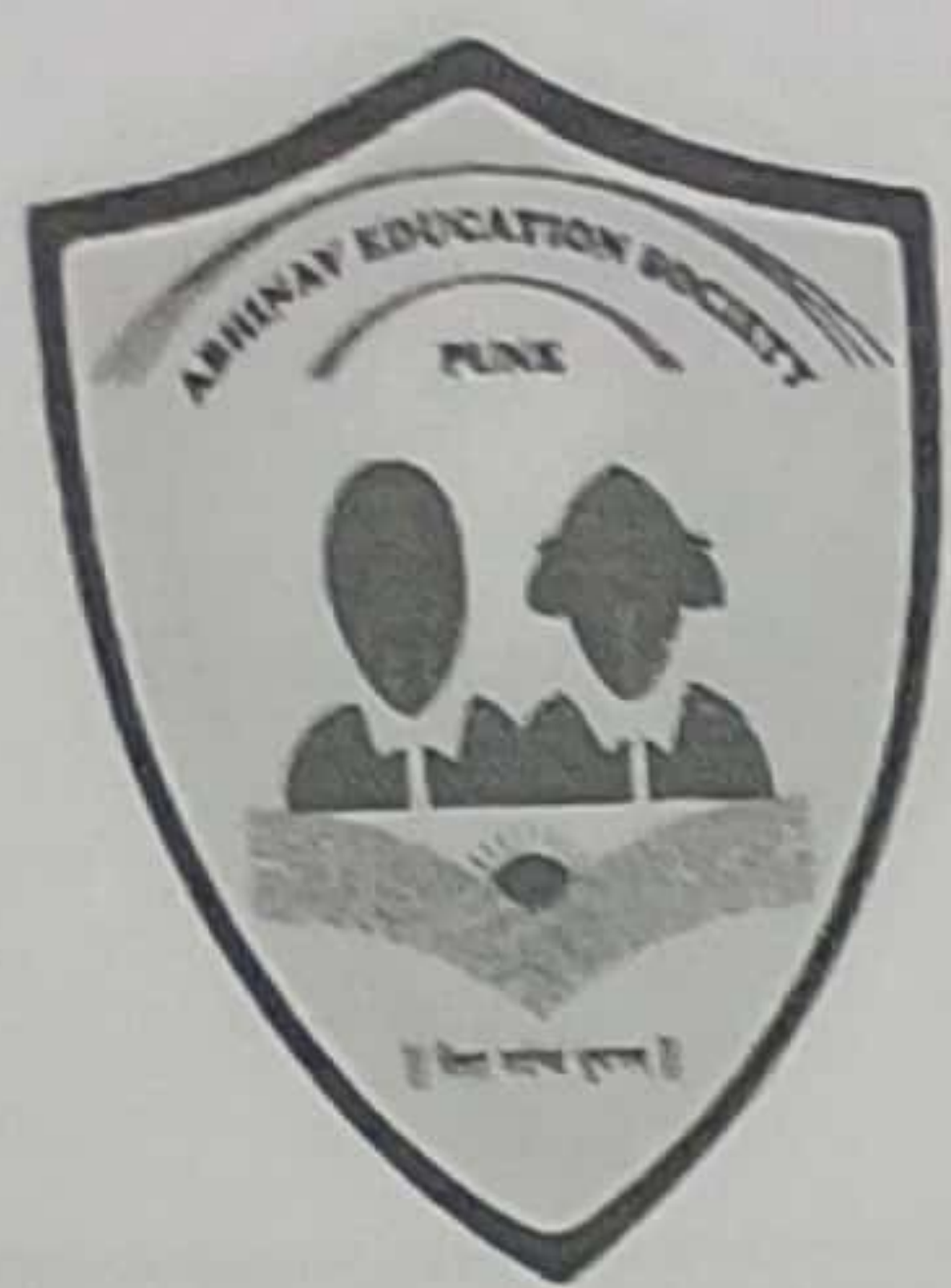
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				2. Students also able to demonstrate and use flame photometry, nepheloturbidometry and electrophoresis techniques and their applications in pharmaceutical industry.
35		Industrial PharmacyII – Theory	BP702T	1. Know the process of pilot plant and scale up of pharmaceutical dosage forms 2. Understand the process of technology transfer from lab scale to commercial batch 3. Know different Laws and Acts that regulate pharmaceutical industry 4. Understand the approval process and regulatory requirements for drug products
36		Pharmacy Practice – Theory	BP703T	1. know various drug distribution methods in a hospital 2. appreciate the pharmacy stores management and inventory control 3. monitor drug therapy of patient through medication chart review and clinical review 4. obtain medication history interview and counsel the patients 5. identify drug related problems 6. detect and assess adverse drug reactions 7. interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states 8. know pharmaceutical care services 9. do patient counseling in community pharmacy; appreciate the concept of Rational drug therapy.
37		Novel Drug Delivery System – Theory	BP704T	1. To understand various approaches for development of novel drug delivery systems. 2. To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation.
38		Practice School*	BP706P S	1. Application of knowledge gained in isolation, identification, standardization, formulation, manufacturing & evaluation of pharmaceuticals.



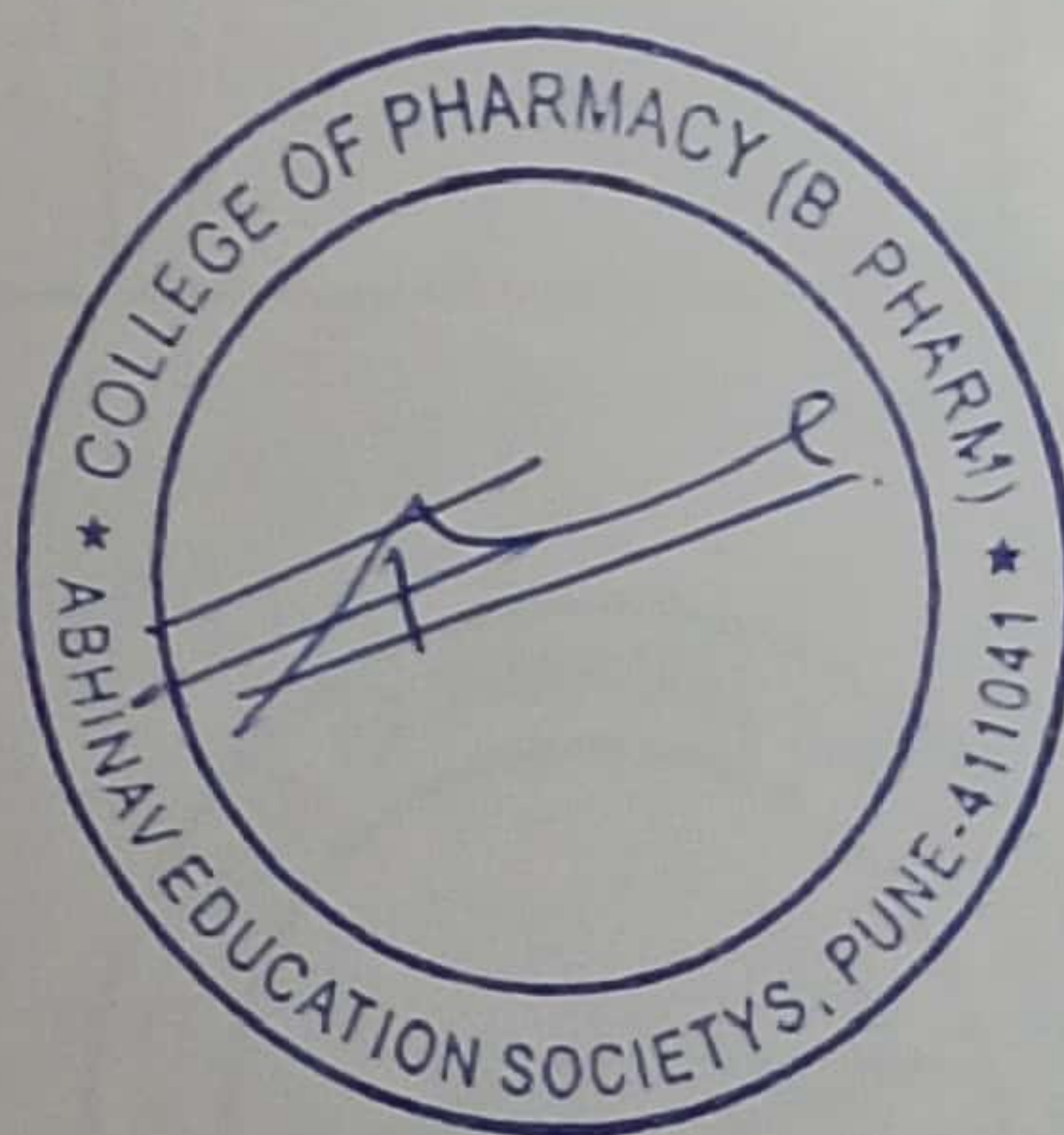


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39	Final Year Sem VIII	Biostatistics and Research Methodology	BP801T	1. Know the operation of M.S. Excel, SPSS, R and MINITAB [®] , DoE (Design of Experiment) 2. Know the various statistical techniques to solve statistical problems 3. Appreciate statistical techniques in solving the problems.
40		Social and Preventive Pharmacy	BP802T	1. Understand the importance of community health, know about national and international community health programs, 2. Role of pharmacist in creating awareness and improving the community health
41		Pharmacovigila ne	BP805E T	1. Gain knowledge on history, importance, detection, methods of reporting, coding, evaluation and guidelines of pharmacovigilance of drugs. 2. International standards for classification of diseases and drugs 3. Methods to generate safety data during pre clinical, clinical and post approval phases of drugs' life cycle
42		Cosmetic Science	BP809E T	1. Able to understand the regulations, building blocks, manufacturing and evaluation of cosmetics for skin, hair, nail and teeth. 2. Also the use of herbs in cosmetic preparations and knowledge of cosmeceuticals.
43		Project Work	BP813P W	





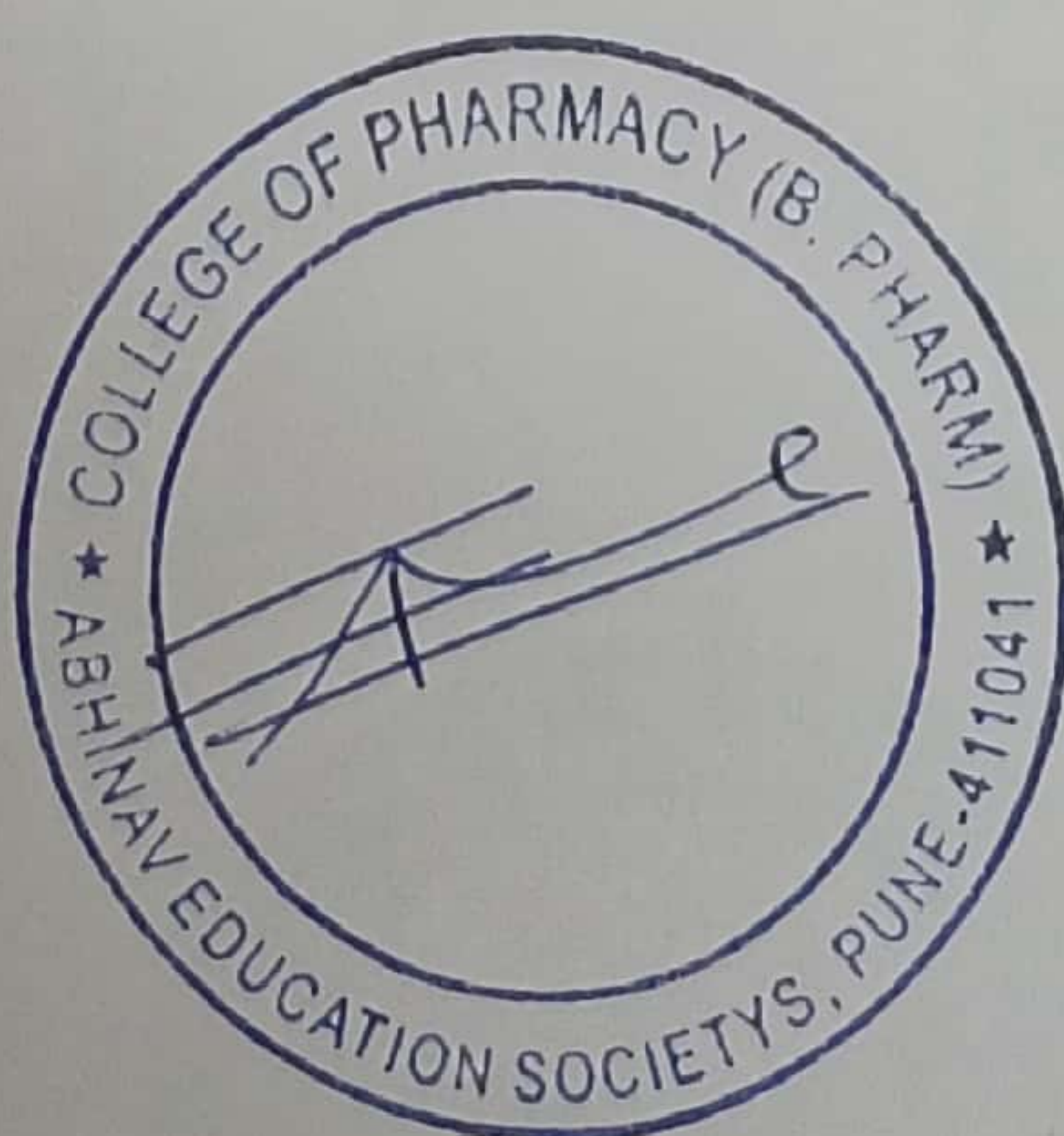
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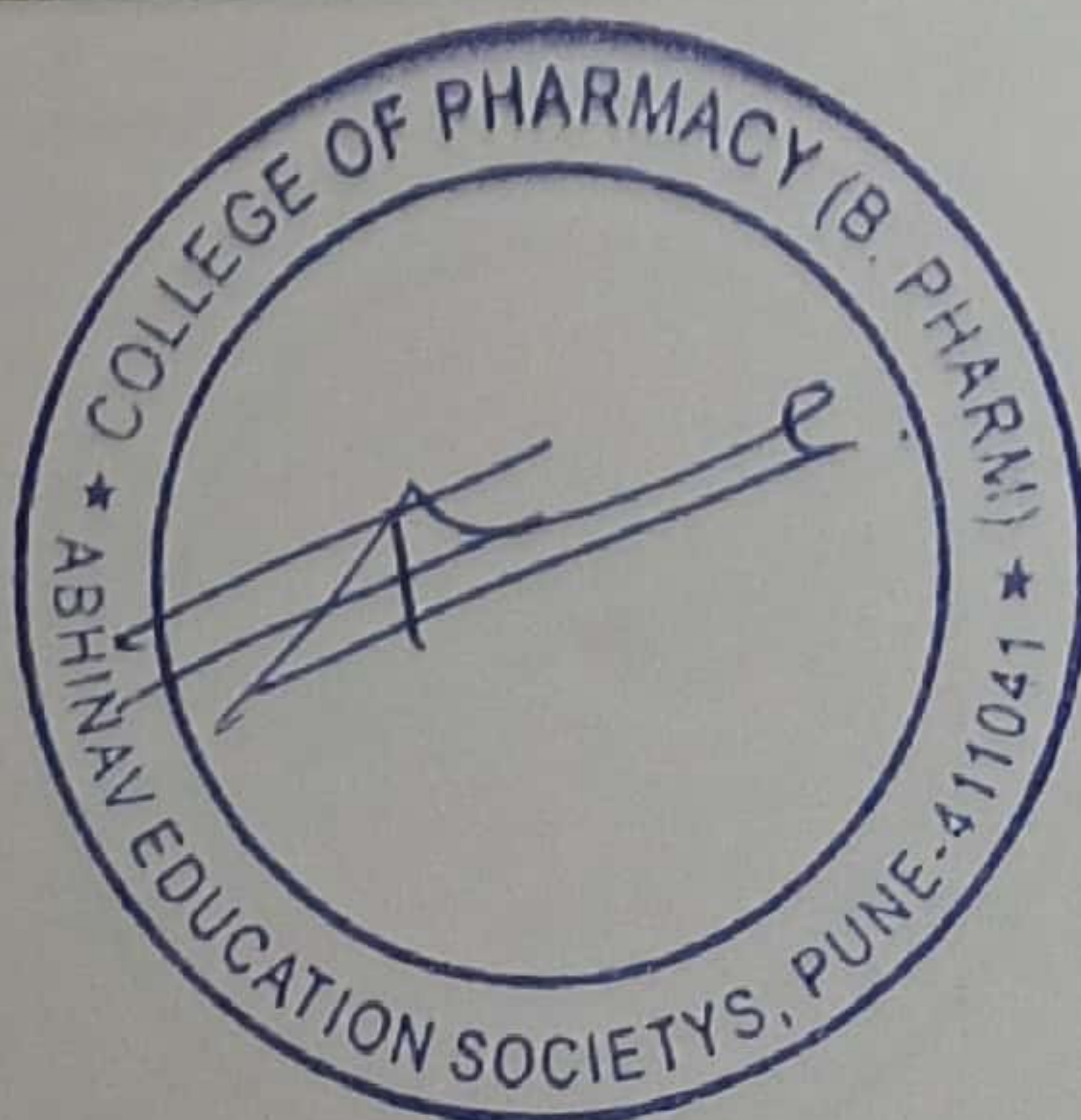
COURSE OUTCOME FOR PHARM D

Sr. No.	Year & Sem	Subject Name	Subject Code	Course Outcomes
1	First Year Pharm D	Human Anatomy & Physiology	PD101T & PD101P	<p>1. They would have learnt the gross anatomy, histology and physiology of various organs of the human body.</p> <p>2. They would identify the various tissues and organs associated with the different organ systems with help of charts and specimens.</p> <p>3. They would have studied the coordination in functioning of different organs of each system.</p> <p>4. They would have understood the several physiological homeostatic mechanisms and their imbalances in human body.</p> <p>4. They would have learnt the interlinked mechanisms in themaintenance in normal and physicalexercise conditions.</p> <p>5. They would have learnt andperformed the hematological tests parameters, blood pressure recording, heart rate, pulse and respiratory volumes.</p>



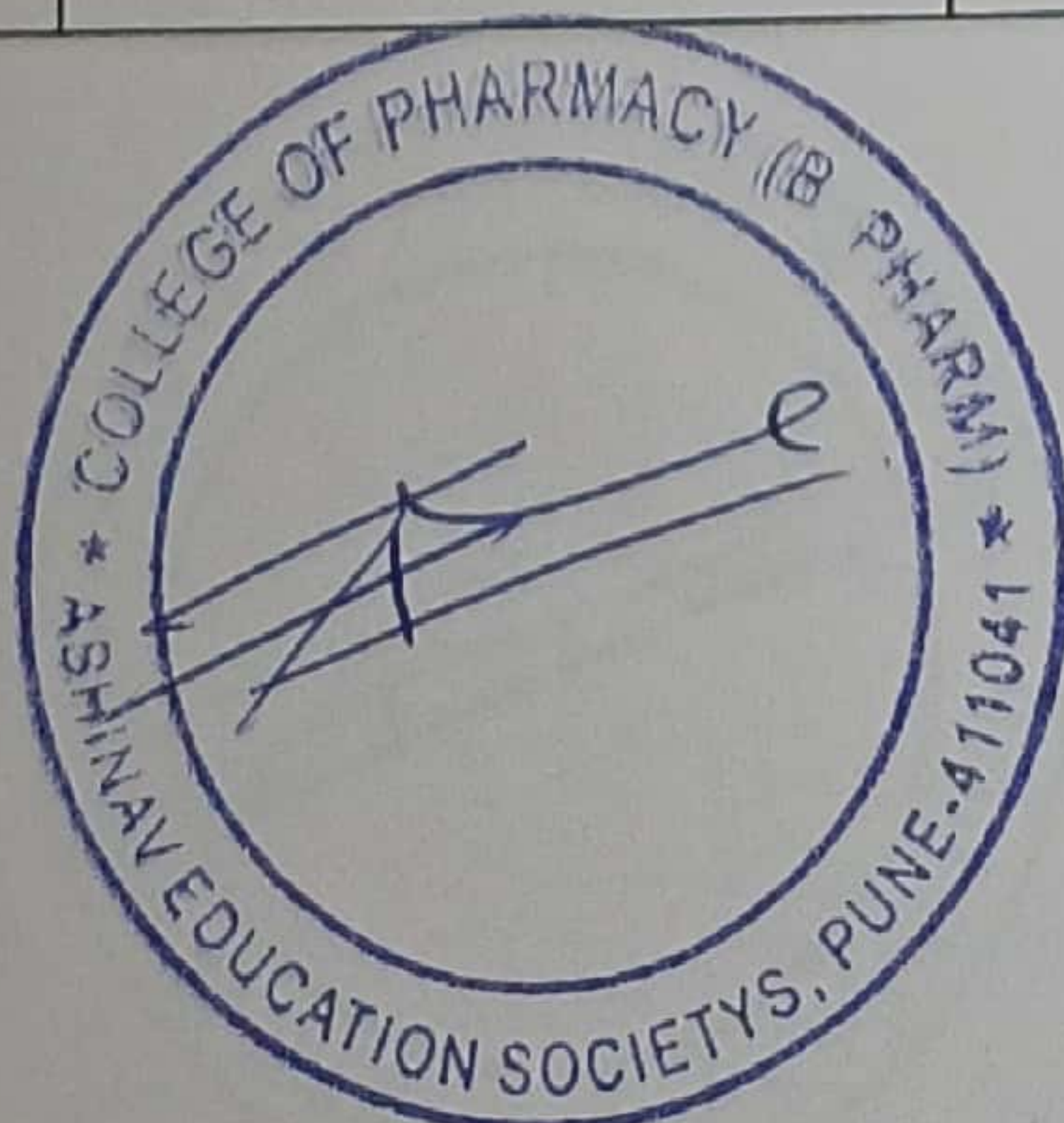


2		Pharmaceutics	PD102T PD102P	&	1. Upon completion of this program the student will know the formulation aspects of different dosage forms 2. Do different pharmaceutical calculation involved in formulation and appreciate the importance of good formulation for effectiveness.
3		Medicinal Biochemistry	PD103T & PD103P		1. To understand the importance of metabolism of substrates. Will acquire chemistry and biological importance of biological macromolecules. 2. To acquire knowledge in qualitative and quantitative estimation of the biological macromolecules. 3. To know the interpretation of data emanating from a Clinical Test Lab. 4. To know how physiological conditions influence the structures and reactivity's of biomolecules. 5. To understand the basic principles of protein and polysaccharide structure.
4		Pharmaceutical Organic Chemistry	PD104T PD104P	&	1. To be able to give systematic names to simple organic compounds and poly functional group. 2. To achieve an understanding of the behavior of organic compounds and to establish a foundation for studies into natural and synthetic products of pharmaceutical interest. 3. To acquire the knowledge and understanding of the basic experimental principles of pharmaceutical organic chemistry. 4. To draw the structures and synthesize simple pharmaceutically active organic



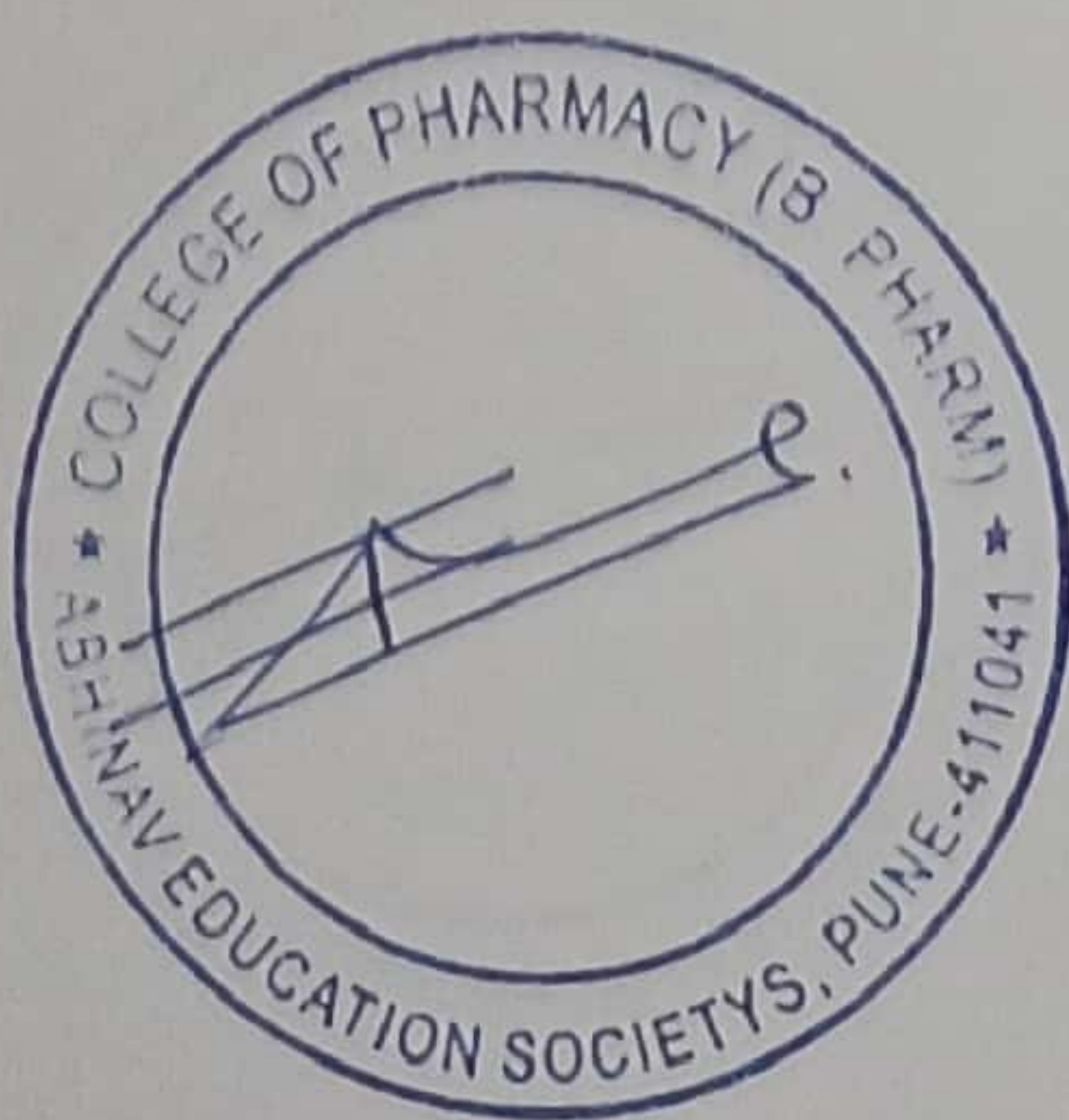


				compounds. 5.To describe detailed mechanisms for common reactions. 6.To be able to run experimental techniques, procedures and safe laboratory practices.
5		Pharmaceutical Inorganic Chemistry	PD105T & PD105P	1.Well acquainted with the principles of limit tests. 2.Understand the principles and procedures of analysis of drugs and also regarding the application of inorganic pharmaceutical. Knowledge about the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals. 3.Appreciate the importance of inorganic pharmaceuticals in preventing and curing the disease. 4.To have been introduced to a variety of inorganic drug classes. 5.To know the analysis of the inorganic pharmaceuticals their applications.
6		Remedial Mathematics	PD106RMT,	1.Apply mathematical concepts and principles to perform computations for Pharmaceutical Sciences. 2.Create, use and analyze mathematical representations and mathematical relationships. 3.Communicate mathematical knowledge and understanding to help in the field of Clinical Pharmacy. 4.Perform abstract mathematical reasoning
		Remedial Biology	PD106RBT & PD106RBP	5.The main aim of this course is to make aware the students to understand and learn about, Cell



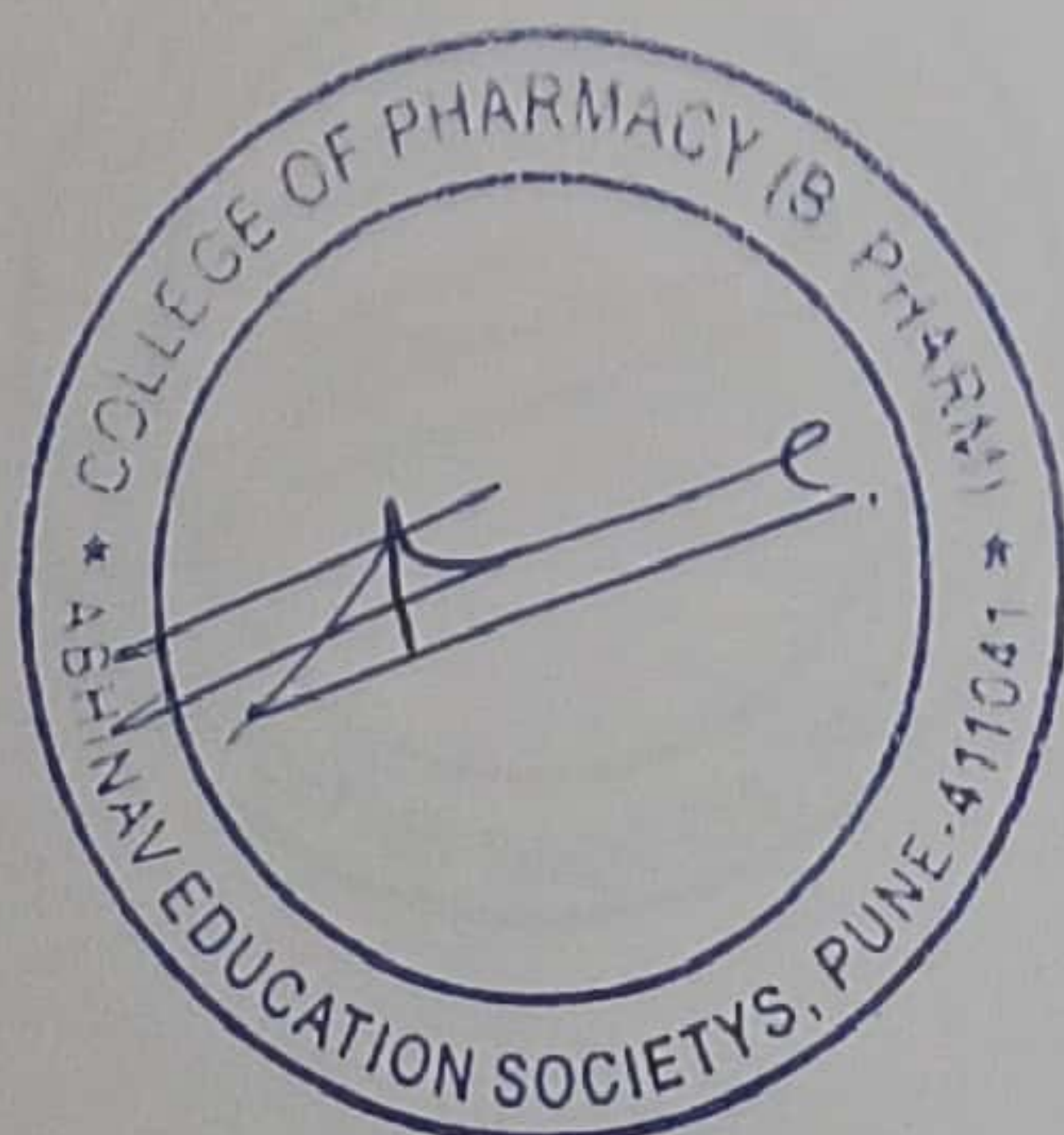


				biology (Basic Nature of Plant cell and Animal cell), Classification System of both Plants & Animals, Various tissue system and organ system in plant and animals, 6.Theory of evolution, Anatomy and Physiology of plants and animals.
7	Second Year Pharm D	Pathophysiology	PD201T	<p>1. Students will define the basic pathogenesis of human disease.</p> <p>2. Students will define and explore the most common etiologies and predisposing factors associated with human disease.</p> <p>3.Students understands the basis for some laboratory tests and other diagnostic procedures</p> <p>4. Students will make correlations between pathophysiology and clinical skills they are learning in their allied health science programs.</p> <p>5. Students will understand how the various organ systems are interrelated, and use this understanding to promote a holistic approach towards the evaluation and treatment of patients.</p>
8		Pharmaceutical Microbiology	PD202T PD202P	<p>& 1.Students can able to demonstrate an understanding at an advanced level of microbial virulence mechanisms and host response to infection; application of molecular techniques to medical microbiology; microbial susceptibility and resistance to antimicrobial agents; replication of viruses, viral immunology and pathogenesis, detection of viruses.</p> <p>2.Students can able to understanding of various infections (microbial causes, pathogenesis, transmission of infection,</p>



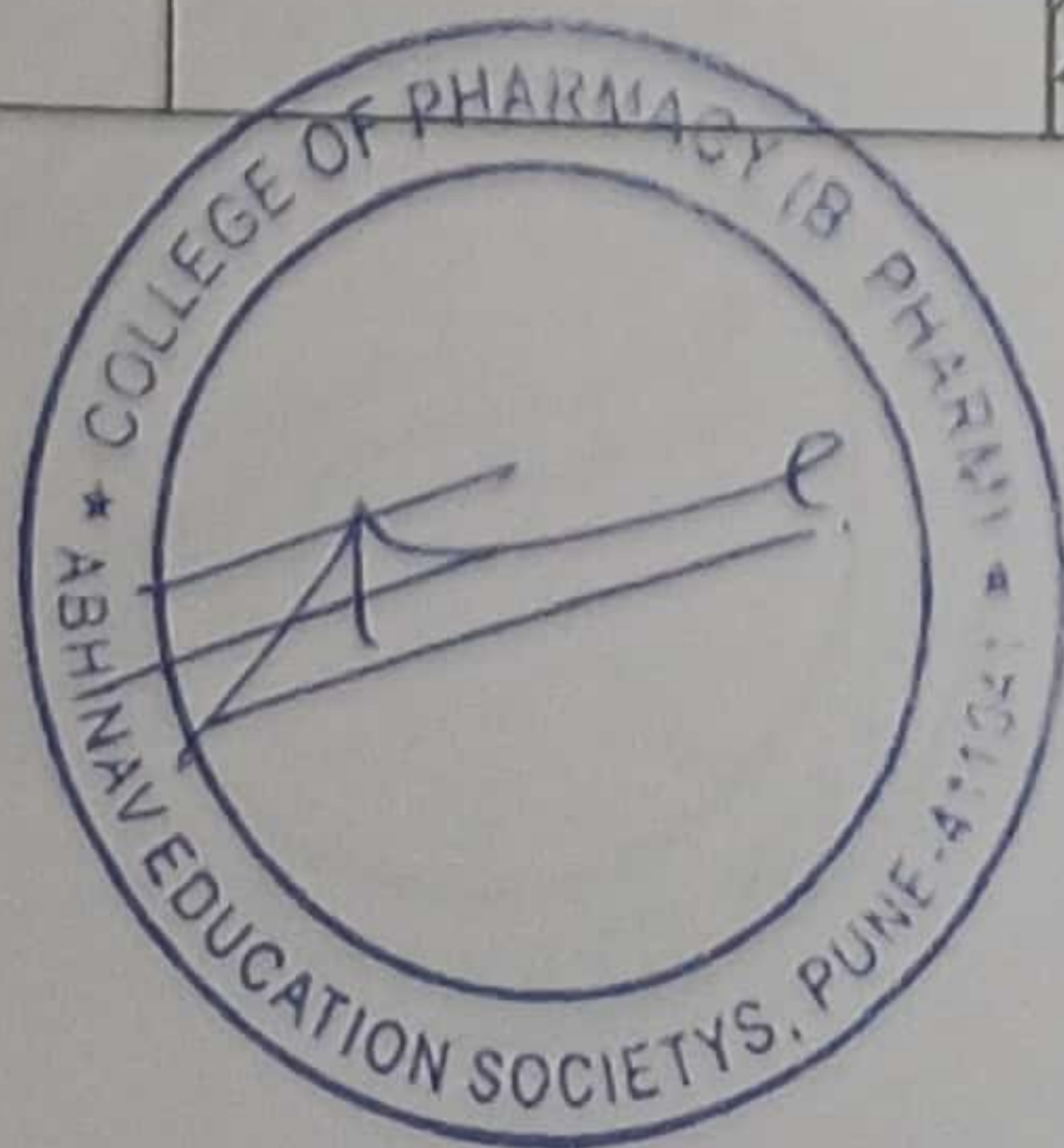


				<p>diagnosis, prevention and treatment) by being able to identify a unknown organisms in clinical samples, and describe the pathogenesis of important pathogens.</p> <p>3.Students Demonstrate a basic understanding of the pathogenesis of some important fungal infections of humans, and be able to identify and isolate them from clinical samples.</p> <p>4.Students Work cooperatively as part of a small group and Critically assess and interpret scientific literature.</p> <p>5.Students can Analyze and report on complex research questions, and solve problems, plan a work program or diagnostic strategy and learn independently</p> <p>6.Students can able to demonstrate safe working practices in microbiology, adhere to microbiological requirements for safe work procedures</p>
9		Pharmacognosy & Phytopharmaceuticals	PD203 T & PD203 P	<p>1.This course is one of the most advanced introductions in Herbal Medicines that is offered.</p> <p>2.Will learn and get experience about, Herbs and their Science, Classification of Medicinal Plants, Phytochemistry, Carbohydrates, Lipids, Terpenes, Polyphenols, Alkaloids, Pharmacology, Toxicity, Formulations and Preparations of Herbal Medicines.</p> <p>3.How herbs influence our physiology and can be helpful against several disorders. Relations between Phyto-</p>



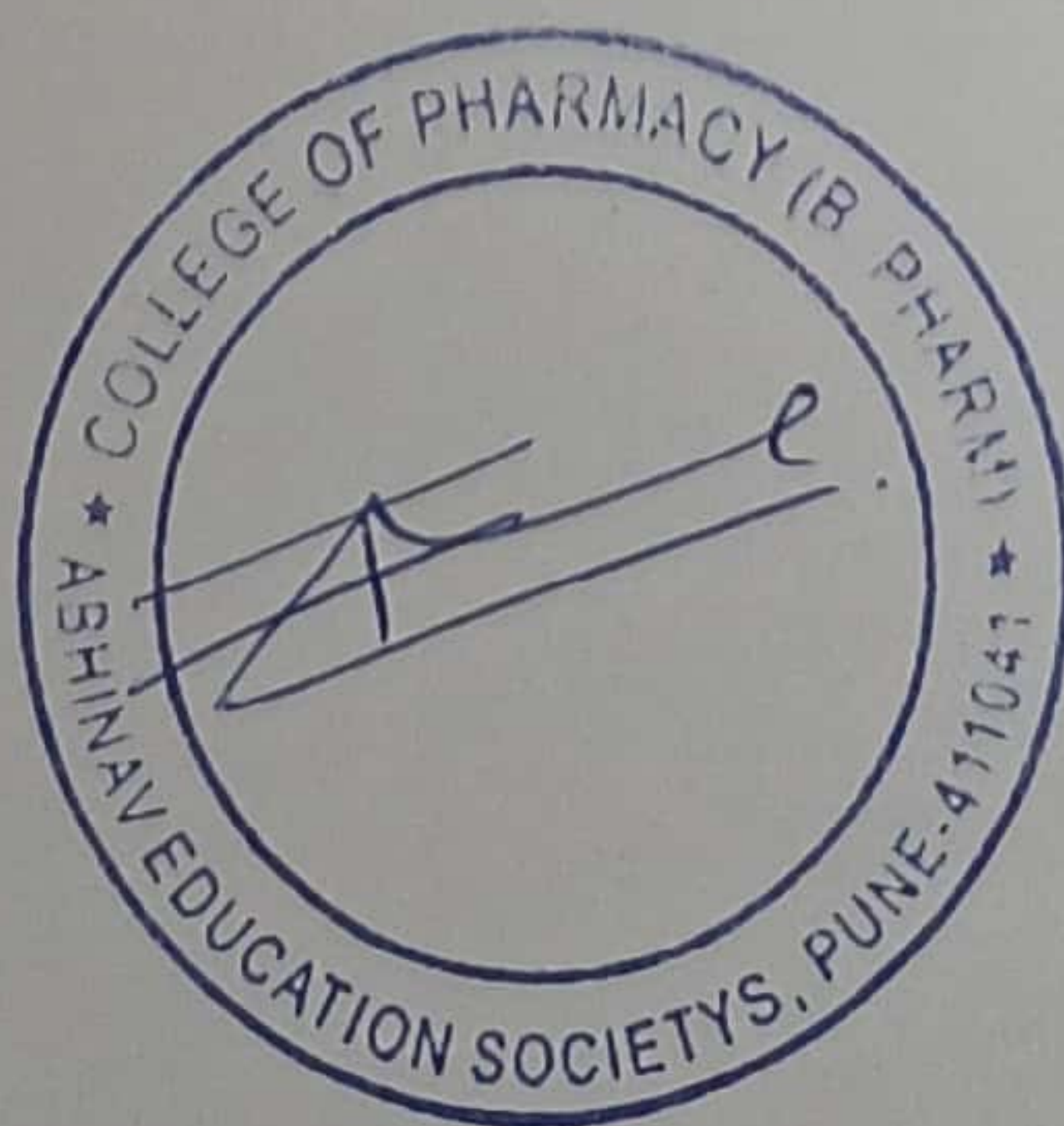


			therapy and the Elderly, Phytotherapy and Children, 4.Understanding Herbal Action, and Understanding the Materia Medica. The recognition of medicinal plants, identification of adulteration and Contamination. 5.Ethnobotany &Ethno pharmacology in drug discovery process. DNA Finger printing.
10		Pharmacology - I PD204T	<ol style="list-style-type: none">1. The student would have learnt about the different drugs used with an emphasis on its classification, Pharmacodynamic2. They would have studied, dose, route of administration, precautions, and contraindications.3. They would have understood the pharmacological aspects of drugs used to treat ailment of different organ systems of the body.4. They would appreciate the importance of drug discovery by preclinical and clinical trials.5. They would appreciate the importance of pharmacology subject as a basis of therapeutics.6. They would apply the knowledge of drugs and its detailed description therapeutically in clinical case scenario.
11		Community Pharmacy PD205T	<ol style="list-style-type: none">1.Students will provide patient-centered care to diverse patients using the best available evidence and in consideration of patients' circumstances to devise, modify, implement, document and monitor pharmacotherapy care plans, either independently or as part of healthcare team.2.Students will demonstrate knowledge



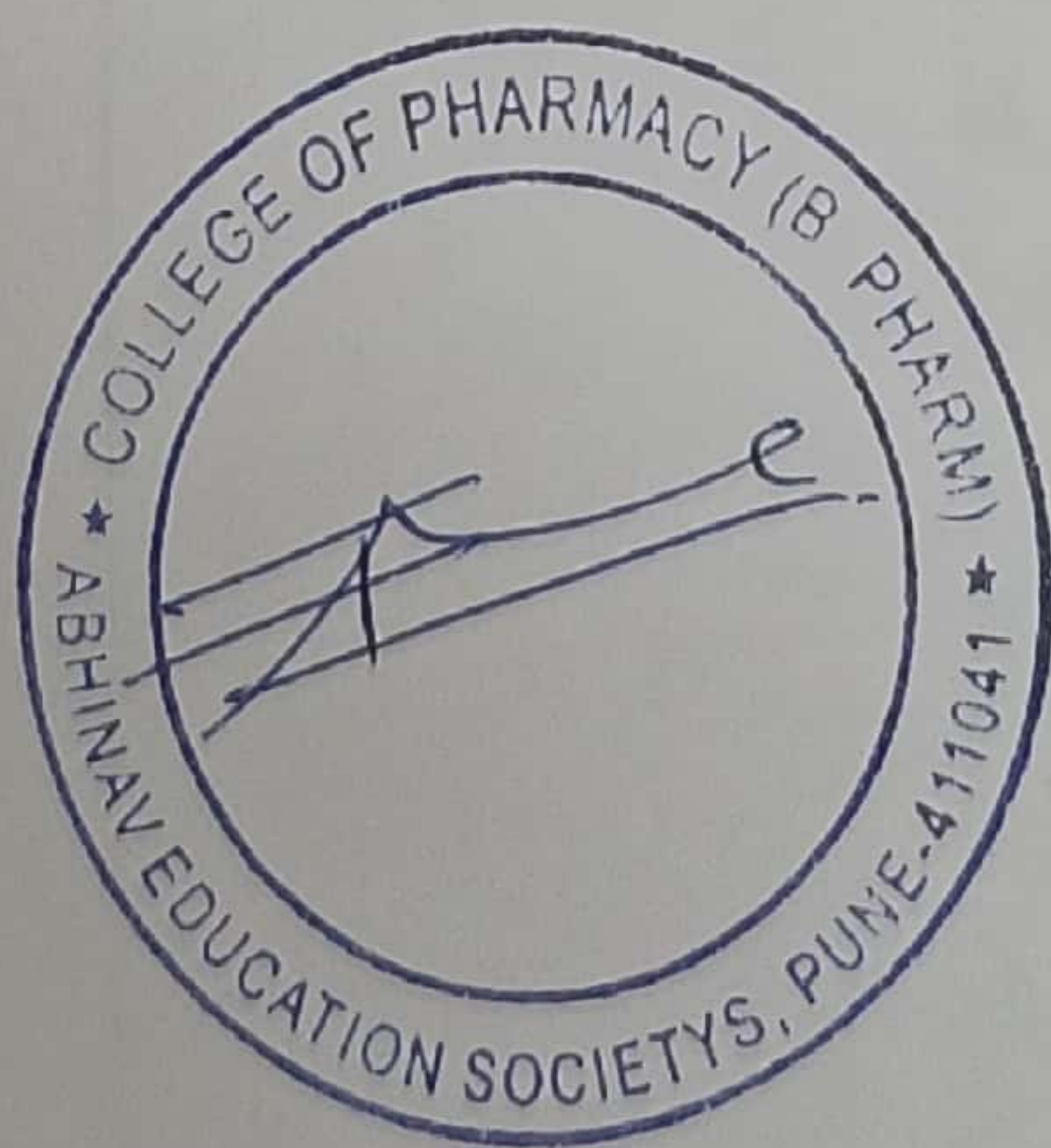


				<p>of the business and professional practice management skills in community pharmacies.</p> <p>3. Students will educate patients through counseling & provide health screening services to public.</p> <p>4. Students will identify symptoms of minor ailments and provide appropriate medication.</p> <p>5. Students will participate in prevention programs of communicable diseases.</p> <p>Students will exhibit professional ethics by promoting safe and appropriate medication use throughout society.</p>
12		Pharmacotherapeutics- I	PD206T PD206P	& <p>1. Students will be able to describe the pathophysiology and management of cardiovascular, respiratory and endocrine diseases.</p> <p>2. Students will be developing Patient case based Assessment Skills.</p> <p>3. Students will be able to describe the quality use of medicines issues surrounding the therapeutic agents in the treatment of these diseases.</p> <p>4. Students will have developed clinical skills in the therapeutic management of these conditions.</p> <p>5. Continue to develop communication skills.</p> <p>Students will provide patient – centred care to diverse patients using the evidence based medicine.</p>



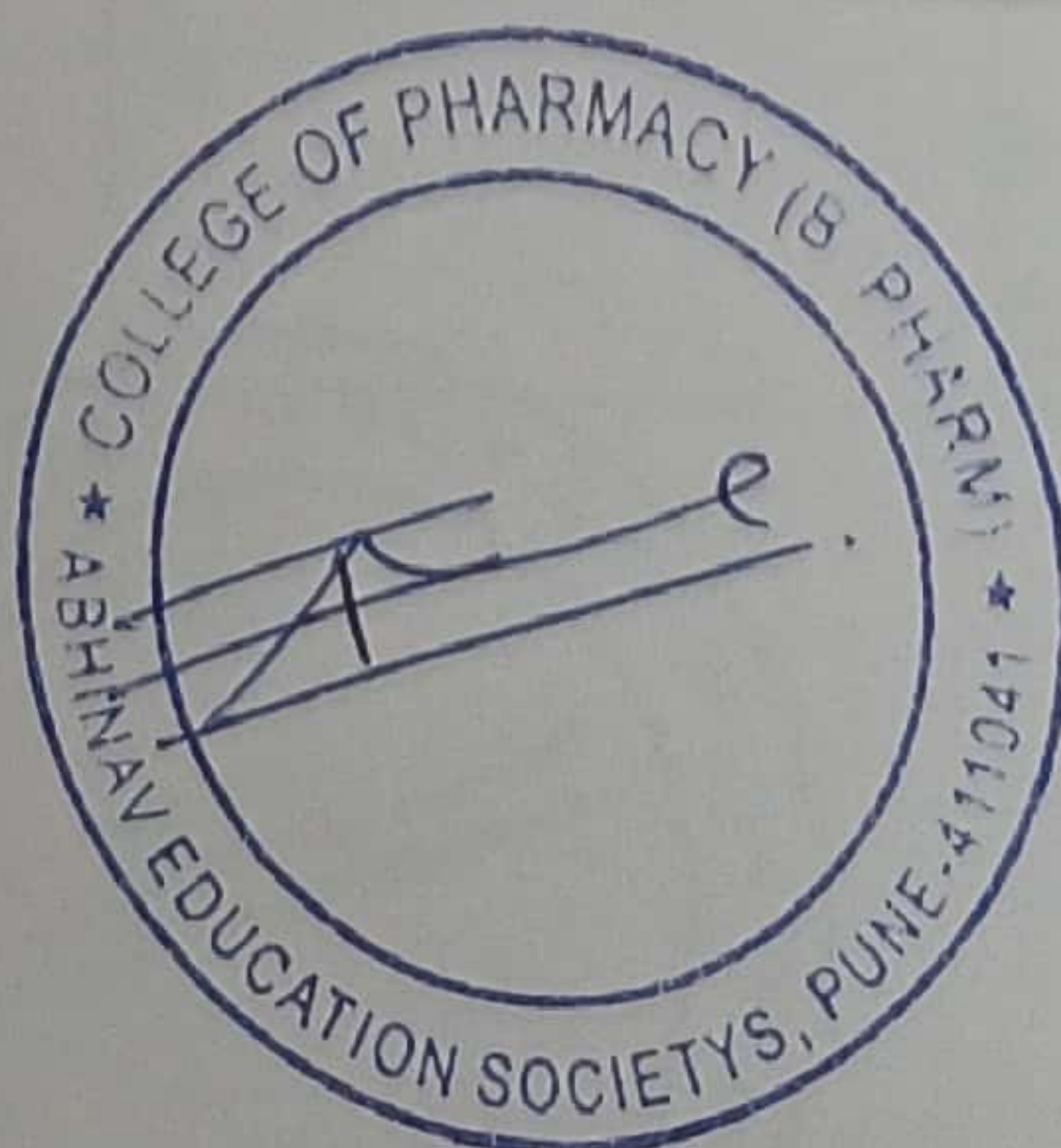


13	Third Year Pharm D	Pharmacology -II	PD301T PD307P	&	<p>1. In continuation with the previous year, this subject would have continued describing about the different drugs used for treatment of diseases.</p> <p>2. The students would have learnt about drugs used to cancer, inflammation, respiratory system, GIT, immune system and hormones.</p> <p>3. They would have understood the principles of animal toxicology and bioassay procedures.</p> <p>4.They would have learnt in depth knowledge on cell, macromolecules, cell signaling, DNA replication and cell cycle.</p> <p>5. They would appreciate the importance of gene and its structure, genome, gene expression, recombinant DNA technology and other associated aspects.</p> <p>6. They would have finally learnt to apply the knowledge of drugs practically using simulated pharmacological experiments.</p>
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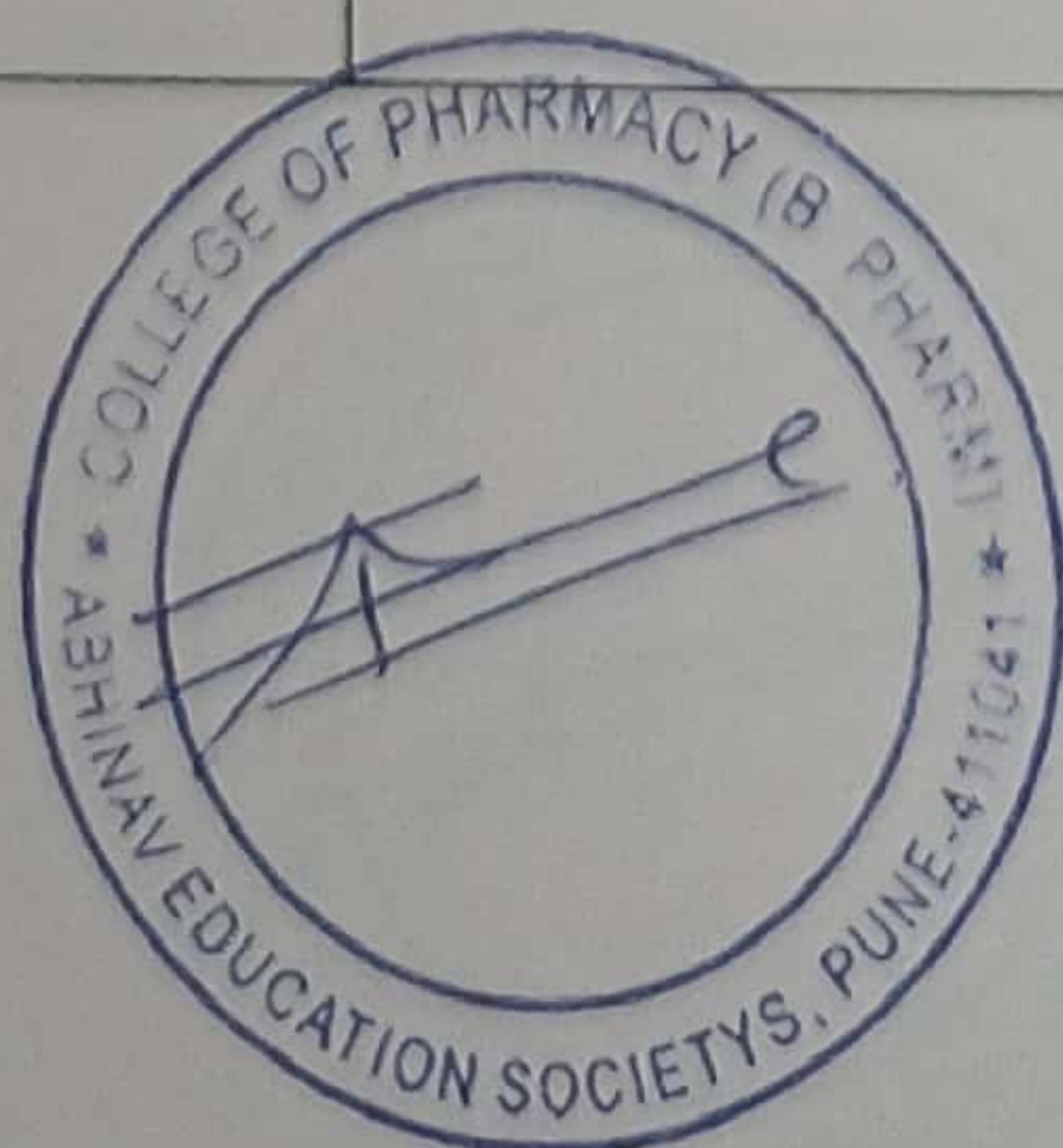


14	Pharmaceutical Analysis	PD302T & PD308P	<ol style="list-style-type: none">1. To understand the importance of analysis in pharmaceutical industry.2. To understand the knowledge about assay of pharmaceutical substance and product3. To develop basic practical skills using instrumental techniques.4. To inculcate theoretical knowledge on various instrumental techniques adopted for analysis of pharmaceuticals.5. To develop various methodologies for assay of drugs and pharmaceuticals with the skills and knowledge gained.6. To understand and gain knowledge on trouble shooting in adopting various methodologies using instrumental techniques.
15	Pharmacotherapeutics – II	PD303T & PD309P	<ol style="list-style-type: none">1. Students will be able to describe the pathophysiology and management of cardiovascular, respiratory and endocrine diseases.2. Students will be developing Patient case based Assessment Skills.3. Students will be able to describe the quality use of medicines issues surrounding the therapeutic agents in the treatment of these diseases.4. Students will have developed clinical skills in the therapeutic management of these conditions. <p>Continue to develop communication skills.</p> <ol style="list-style-type: none">5. Students will provide patient – centred care to diverse patients using the evidence based medicine.



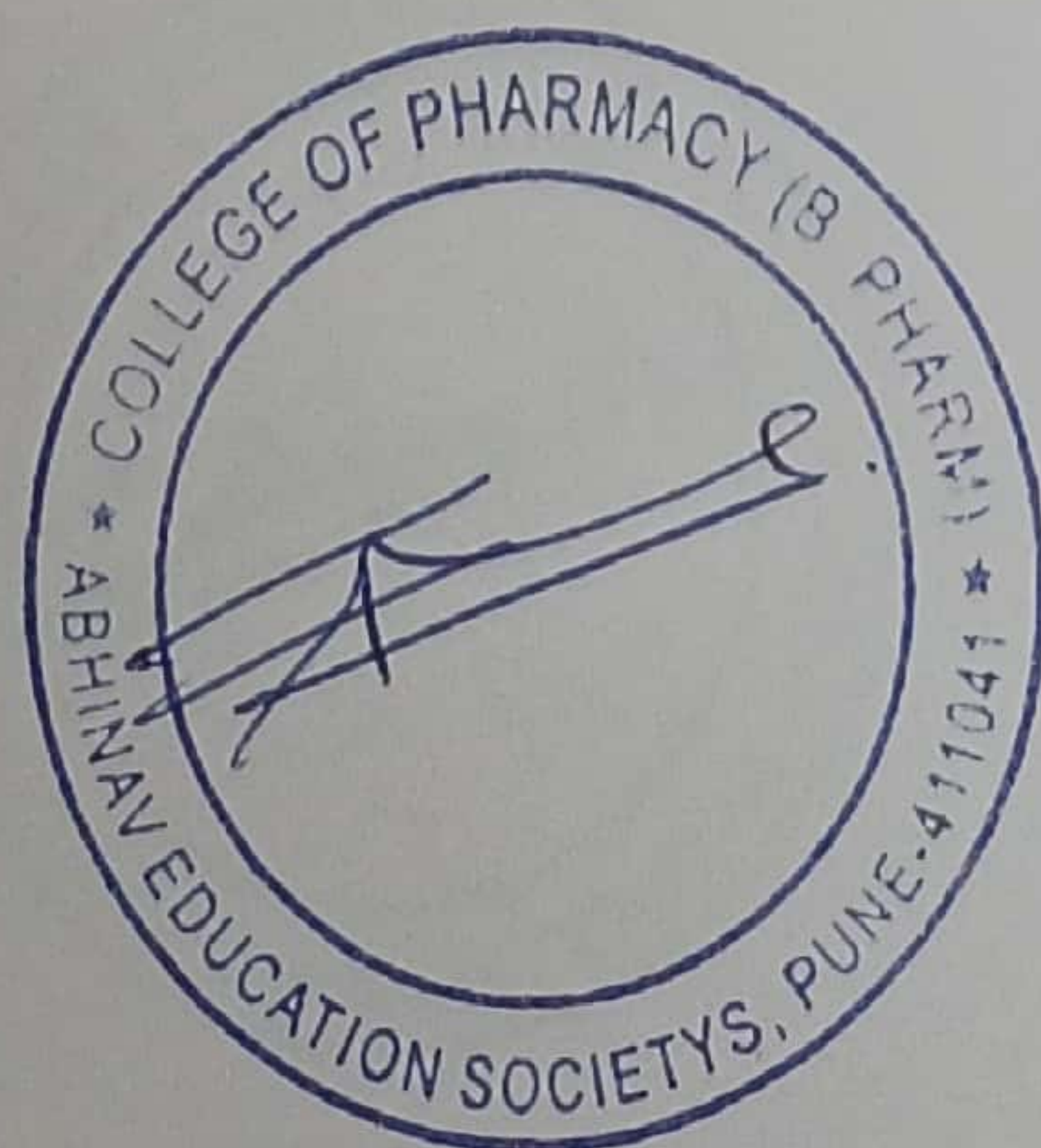


16	Pharmaceutical Jurisprudence	PD304T	<ol style="list-style-type: none">1. Upon Completion of the subject student learnt: About Professional ethics.2. They understood the various concepts of the Pharmaceutical Legislation in India.3. They understood the various parameters in the Drug and Cosmetic Act and rules.4. They understood the various concepts of Drug policy, DPCO, Patent and Designing act.5. They came to know about the labeling requirements and packaging guidelines for Drugs and Cosmetics.6. They understood the concepts of Dangerous Drugs Act, Pharmacy Act and Excise duties Act.7. They came to know about the salient features of different laws which have been prescribed by the Pharmacy Council of India from time to time including International Laws.
17	Medicinal Chemistry	PD305T & PD310P	<ol style="list-style-type: none">1. To understand the chemistry of drugs with respect to their biological activity.2. To know the metabolism, adverse effect and therapeutic activity of drugs.3. To understand the different modern techniques of drug design.4. To appreciate the SAR of some important drug classes.5. To acquire knowledge in the chemotherapy for cancer and microbial diseases and different anti-viral agents.6. To have been introduced to a



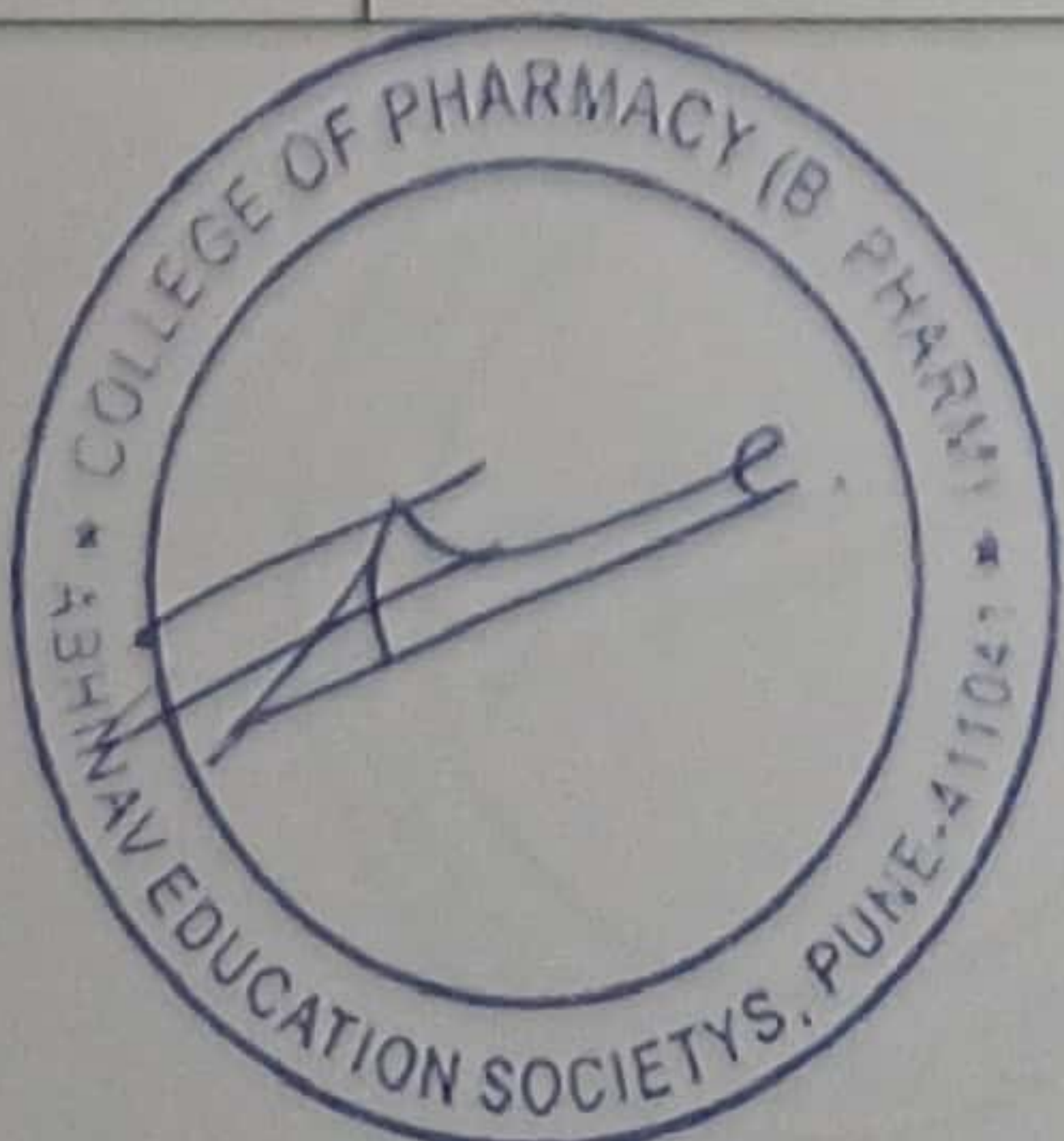


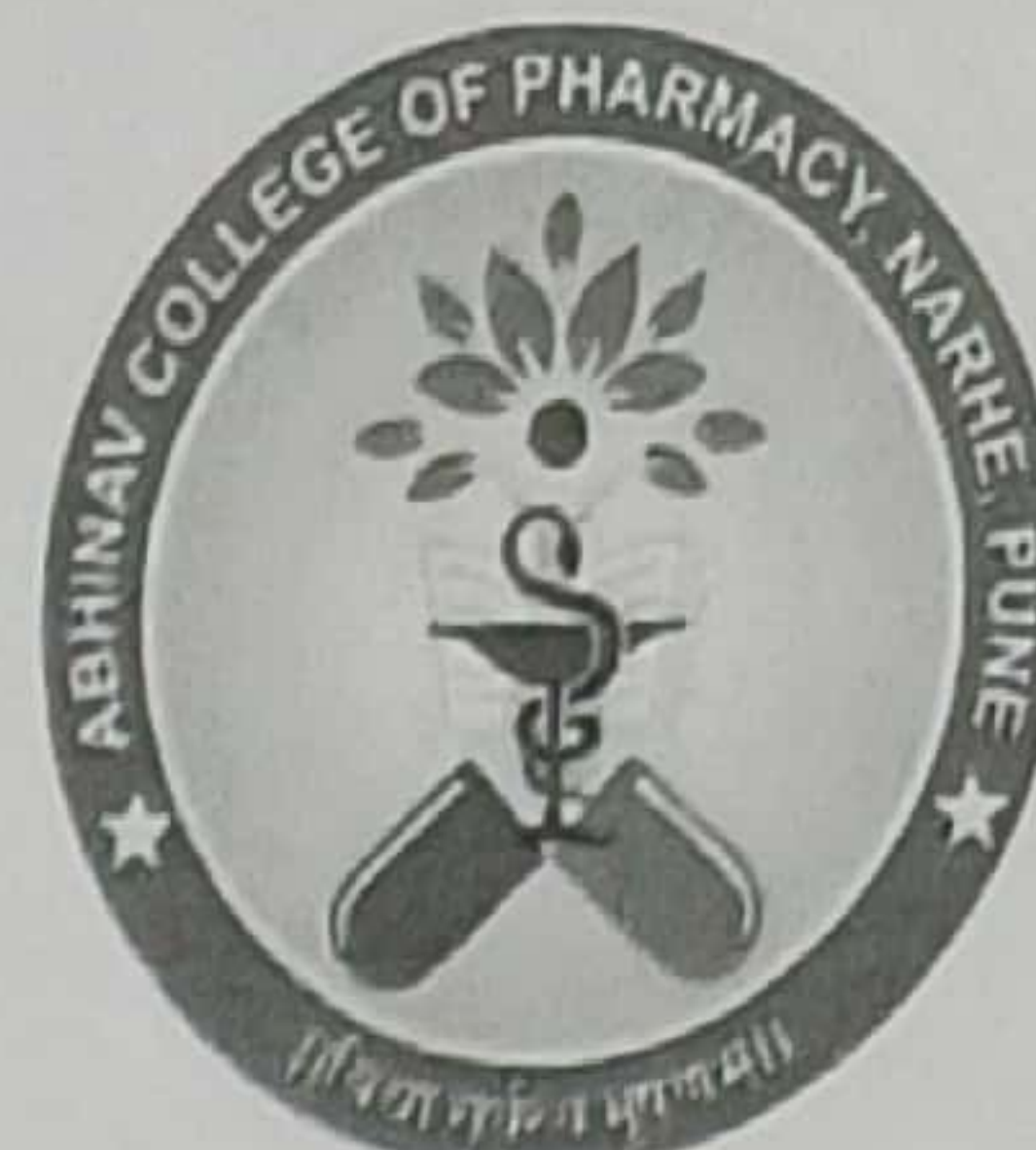
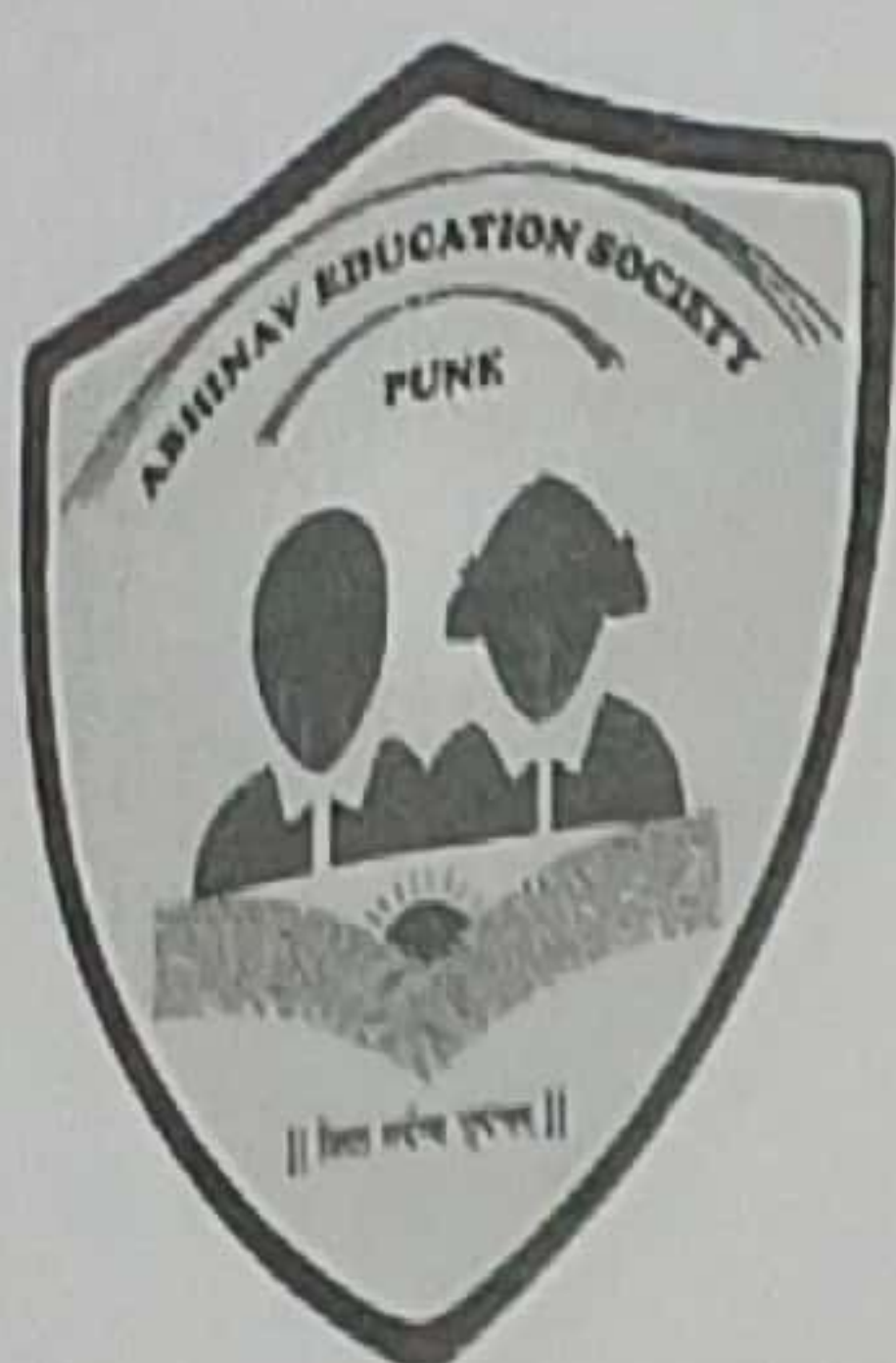
				variety of drug classes and some pharmacological properties.
18		Pharmaceutical Formulations	PD306T & PD311T	1. Students will understand the principle involved in formulation of various pharmaceutical dosage forms prepare various pharmaceutical formulation, perform 2. Evaluation of pharmaceutical dosage forms, understand and appreciate the concept of bioavailability and bioequivalence, their role in clinical situations.
19	Fourth Year Pharm D	Pharmacotherapeutics -III	PD401T & PD407P	1. Initiate drug therapy and the anticipated therapeutic goals by therapeutic intervention. 2. Know the effective use of non-pharmacological therapeutic interventions in the treatment of specific diseases, conditions and symptoms. 3. Demonstrate the ability to effectively communicate and work collaboratively together with others in the small group setting. 4. Have moral reasoning, ethical judgement and professionalism.
20		Hospital Pharmacy	PD402T & PD408P	1. Know Various Drug Distribution Methods; Know The Professional Practice Management Skills In Hospital Pharmacies; 2. Provide Unbiased Drug Information To The Doctors; Know



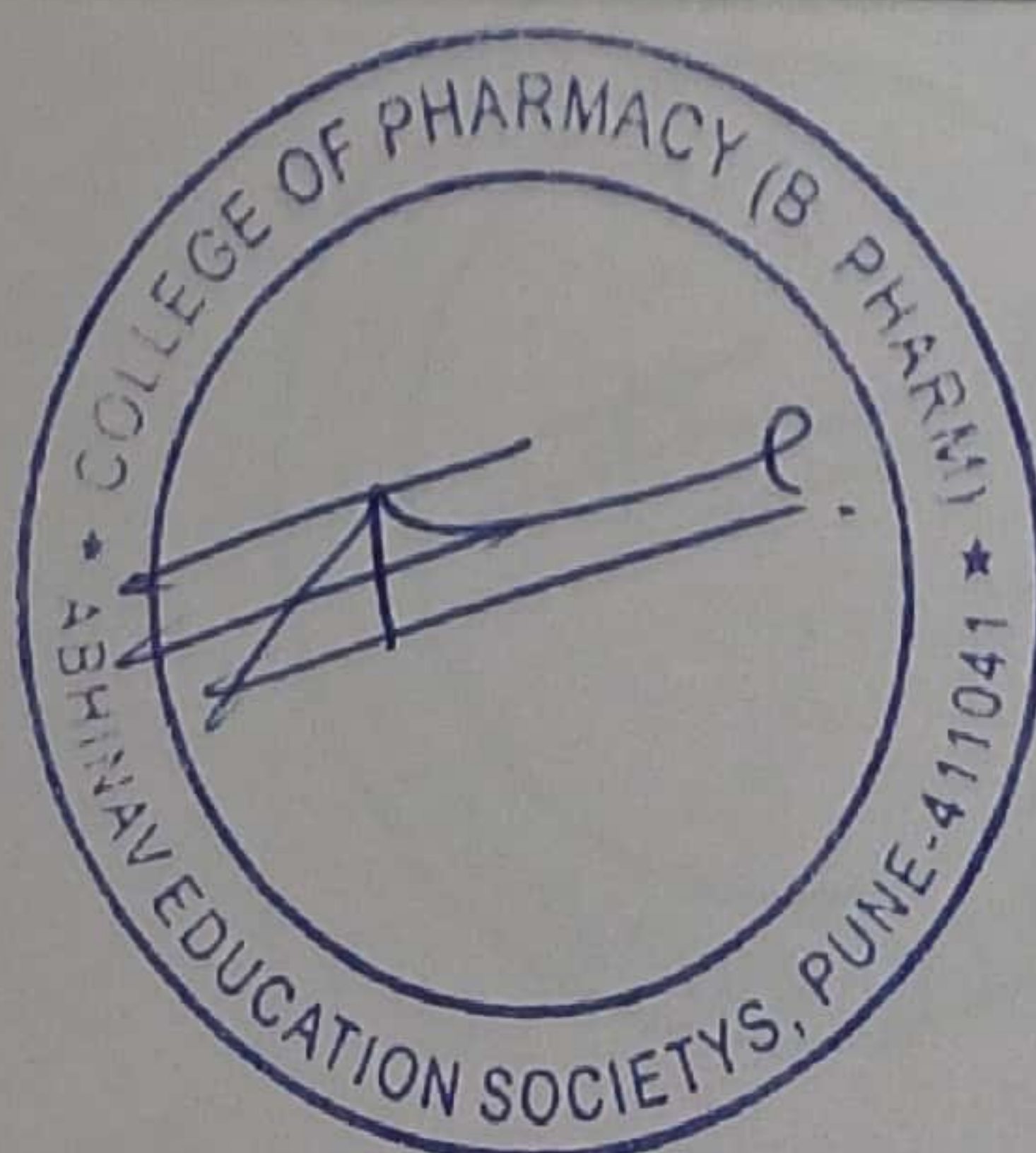


				The Manufacturing Practices Of Various Formulations In Hospital Set Up; 3.Appreciate The Practice Based Research Methods; And Appreciate the stores management and inventory control.
21		Clinical Pharmacy	PD403T & PD409P	1.Monitor drug therapy of patient through medication chart review and clinical review; Obtain medication history interview and counsel the patients; 2.Identify and resolve drug related problems; 3.Detect, assess and monitor adverse drug reaction; Interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states; and Retrieve, analyze, interpret and formulate drug or medicine information.
22		Biostatistics Research Methodology	& PD404T	1. Know the various statistical methods to solve different types of problems. 2. Operate various statistical software packages. 3. Appreciate the importance of Computer in hospital and Community Pharmacy. 4. Appreciate the statistical technique in solving the pharmaceutical problems.
23		Biopharmaceutics & Pharmacokinetics	PD405T & PD410P	1. Broader understanding about the concepts of biopharmaceutics and pharmacokinetics. 2. Ability to calculate the various pharmacokinetic parameters by using various mathematical models. 3.Ability to design a basic protocol for the conduct of BA/BE study and the



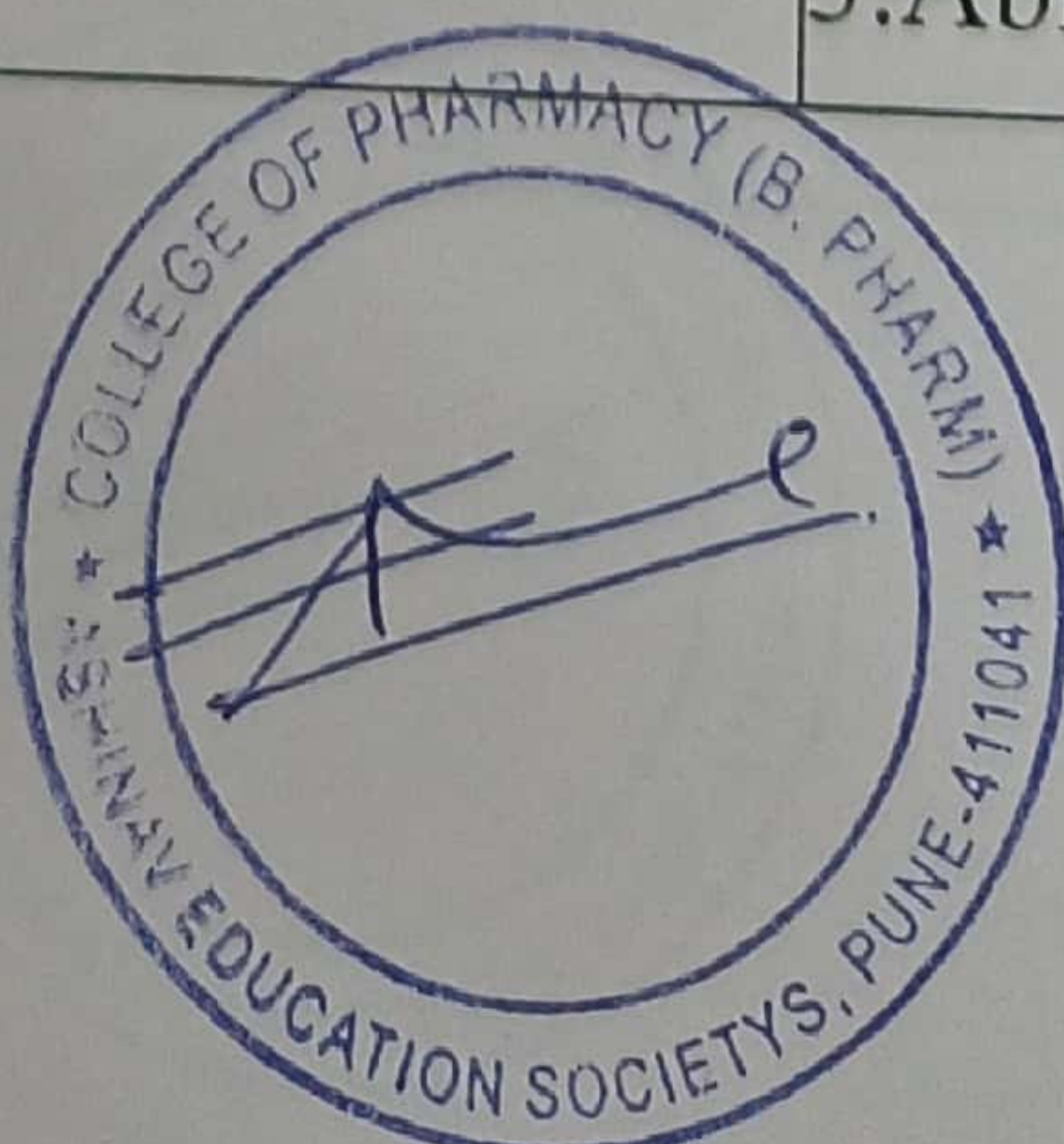


				<p>interpretation of the BA/BE data</p> <p>4. Preparedness to use the concepts of pharmacokinetic principles in the clinical contexts.</p> <p>5. Ability to design and perform in-vitro dissolution studies for various drugs as per the standards of official monographs.</p> <p>6. Basic understanding about the concepts of in-vitro - in-vivo correlations (IVIVC).</p>
24		Clinical Toxicology	PD406T	<p>1. Developing general working knowledge of the principles and practice of clinical toxicology.</p> <p>2. Demonstrating an understanding of the health implications of toxic exposures and commonly involved chemicals for toxicity.</p> <p>3. Demonstrating and applying an understanding of general toxicology principles and clinical management practice.</p> <p>4. Demonstrating and applying an understanding of the history, assessment, and therapy considerations associated with the management of a toxic exposure.</p> <p>5. Demonstrating and apply an understanding of the characteristics of and treatment guidelines for specific toxic substances.</p> <p>6. Proposing several preventive approaches to reduce unintentional poisonings.</p> <p>7. Enabling the pharmacist to function as contributing health care team member when faced with a toxic exposure experience, including emergencies.</p>





25	Fifth Year Pharm D	Clinical Research	PD501T	<ol style="list-style-type: none">1. Know the new drug development process.2. Understand the regulatory and ethical requirements.3. Appreciate and conduct the clinical trials activities.4. Know safety monitoring and reporting in clinical trials.5. Manage the trial coordination process6. Know the new drug development process.7. Understand the regulatory and ethical requirements.8. Appreciate and conduct the clinical trials activities.9. Know safety monitoring and reporting in clinical trials. Manage the trial coordination process.
26		Pharmacoepidem iology & Pha rmacoeconomics	PD502T	<ol style="list-style-type: none">1. Describe the methods used in Pharmacoepidemiology.2. Demonstrate competency in the design, conduct and evaluation of Pharmacoepidemiology studies.3. Describe the methods used in Pharmacoeconomic analysis.4. Demonstrate competency in the design, conduct and evaluation of Pharmacoeconomic studies.
27		Clinical Pharmacokinetics & Pharmacotherape utic Drug Monitoring	PD503T	<ol style="list-style-type: none">1. Ability to apply the concepts of Pharmacokinetics to individualize the drug dosage regimen in clinical settings.2. Ability to design a dosage regimen of a drug based on its route of administration.3. Ability to design and implement



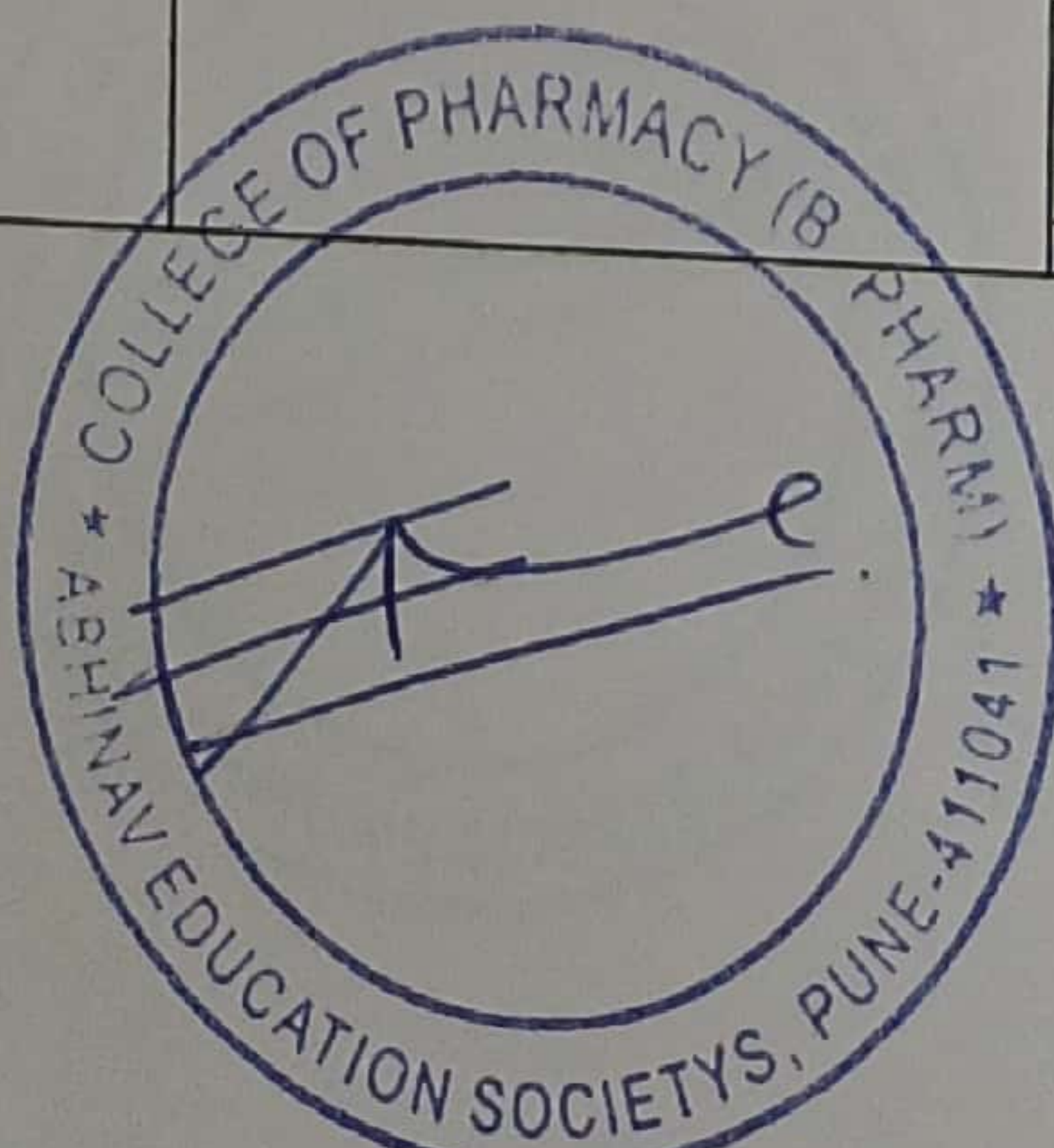


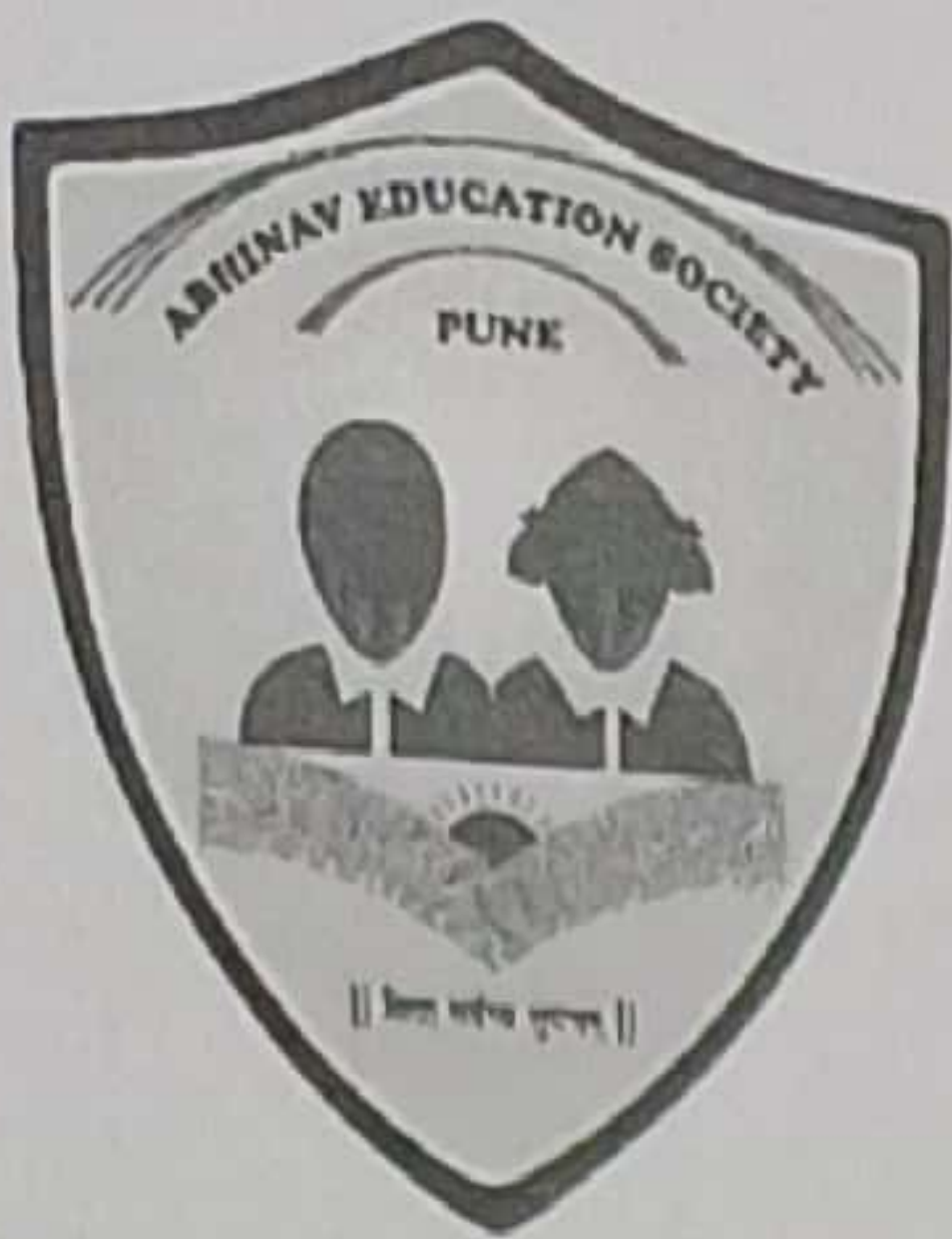
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			pharmacokinetic services such as, Intravenous to Oral conversion of dosage regimens, Therapeutic Drug Monitoring Services, 4. Broader understanding about the significance of altered pharmacokinetics, Pharmacogenetics and Pharmacometrics, Ability to adjust the dosage regimen for patients with renal / hepatic impairments, 5. Ability to assess the drug interaction issues in the clinical settings, Ability to design and implement therapeutic drug monitoring services for various drugs.
28	Internship/Clerkship	PD504T	1. Students will be able to do critical analysis of prescriptions providing pharmacist interventions, drug information services, assessment of drug-drug interactions, adverse drug reactions and bed side patient counselling
29	Project Work (Six months)	PD505PW	1. All Pharm D students must complete a research project in their 5th year as a part of their curriculum. Students will gain knowledge on research methodology, various types of clinical study design, informed consent and good clinical practice guidelines. Publishing their research project will give additional benefit to their careers.
	Case Presentation		1. The pharmacotherapy case presentations have a specific format i.e. SOAP (subjective, objective, assessment and plan). Oral presentation about the real time cases will give knowledge to make patient specific decisions to





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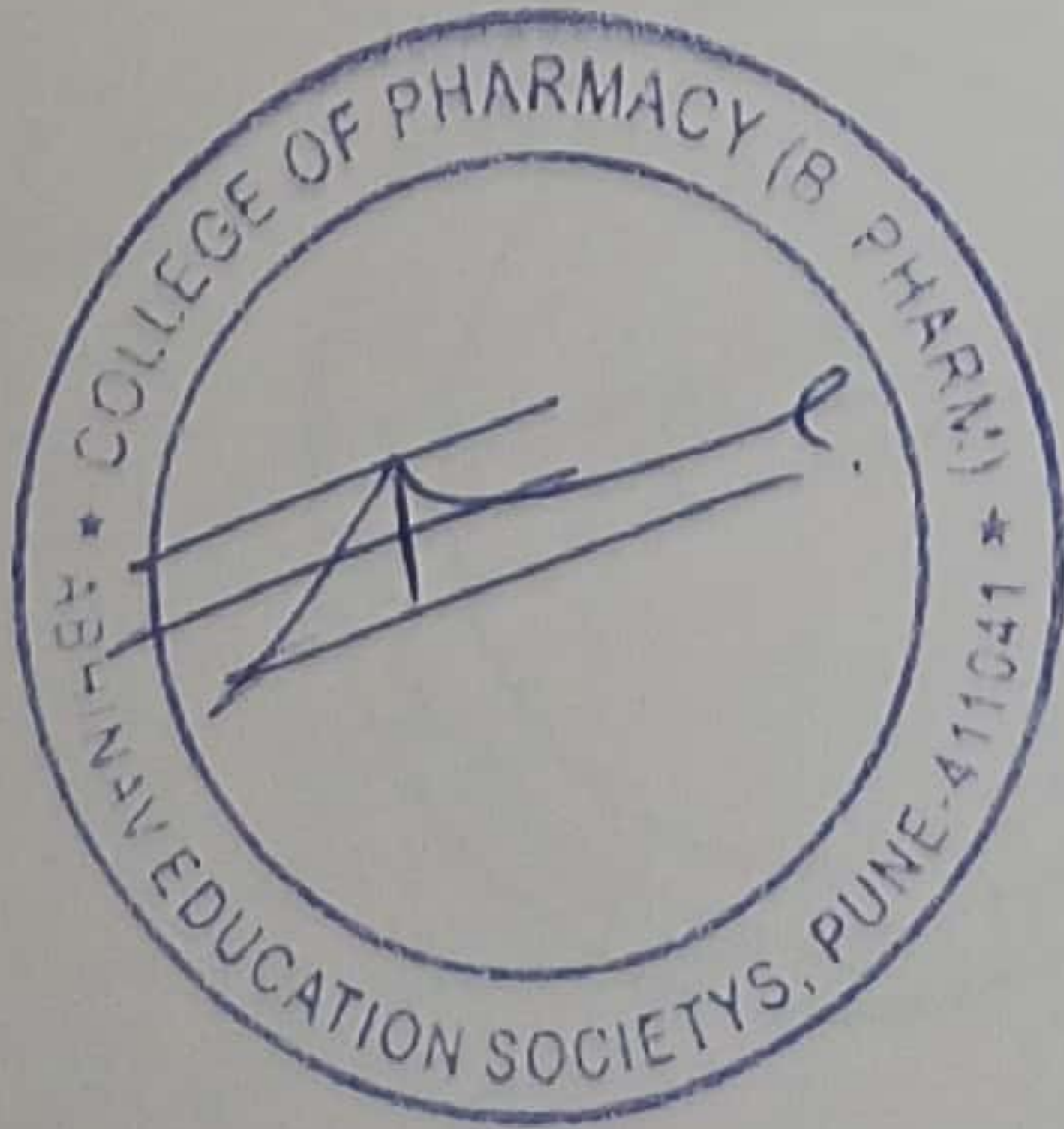
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			produce better outcome and to increase the quality of life of patients.
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COURSE OUTCOMES FOR M.PHARM: PHARMACEUTICAL QUALITY ASSURANCE

Sr. No.	Name of the Program	Name of the Course	Subject Code	Course Outcome
1	M. Pharm	Modern Pharmaceutical Analytical Techniques	MPA101T	<p>1. Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis using various analytical instruments.</p> <p>2. Develops ability to involve in the quantitative & qualitative chromatographic separation and analysis of drugs.</p> <p>3. It facilitates the students to perform the thermal method of analysis of drugs using different instruments.</p> <p>4. Understand the principles of NMR, Mass, X Ray Techniques and assays.</p> <p>5. Develops ability to gain the knowledge about ICH guidelines for impurity and related substances determination in drugs.</p> <p>6. Introduction to product characterization for drug and product development. Analytical Methods development. Validation and calibration of various instruments.</p>





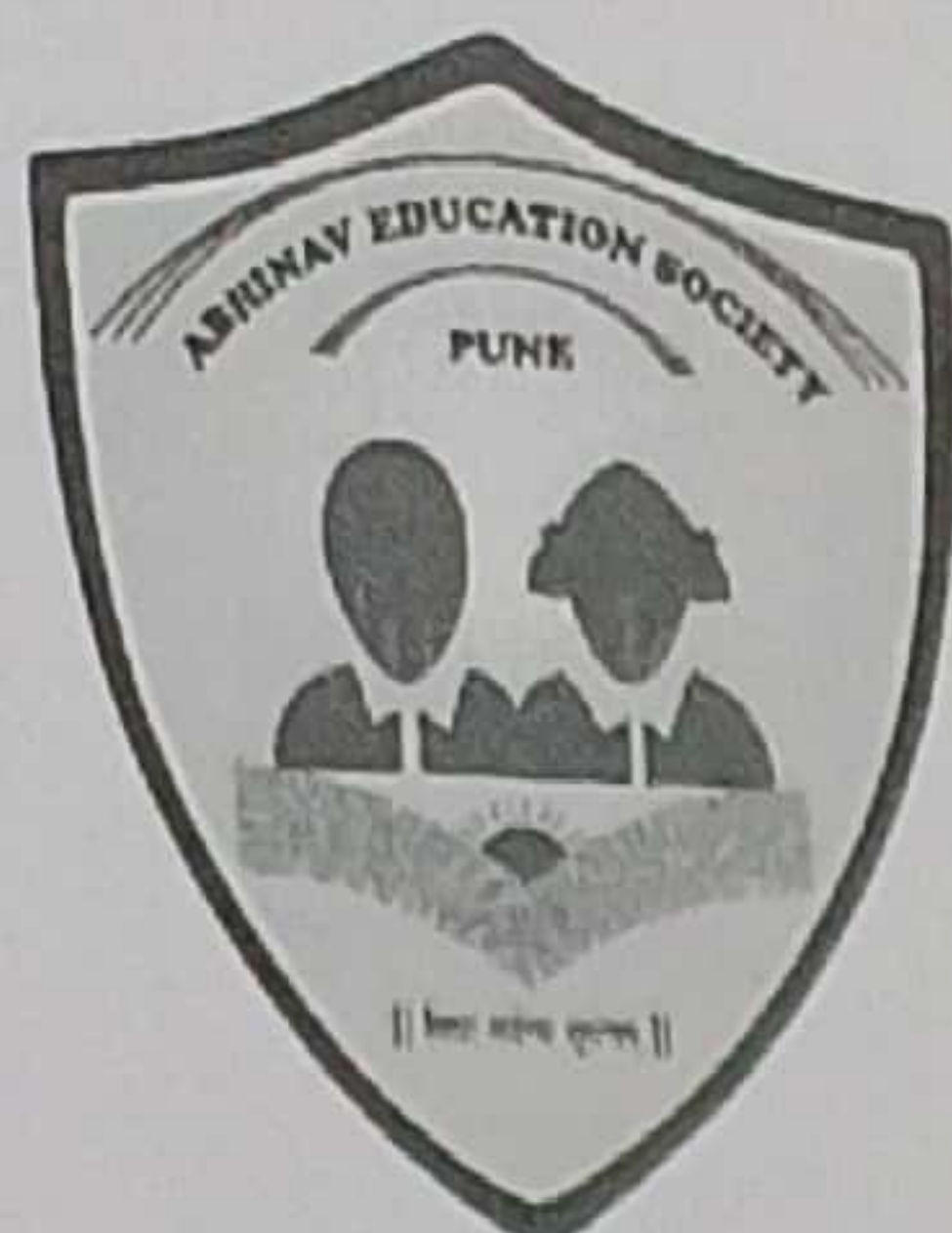
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2	Quality Management System	MQA101T	<p>1. The student will understand the quality parameters and quality attribute in Pharmaceutical industry sectors.</p> <p>2. By studying and practicing the guidelines ISO, NABL and other regulatory agencies student will predicts the current need of changes.</p> <p>3. It provides the idea in the customers' expectations in the quality pharmaceutical product.</p> <p>Student will know the importance of the quality of medicines in the public.</p> <p>4. The subject will afford methodology in the regulatory body requirements for the import and export pharmaceutical products.</p>
3	Quality control and Quality Assurance	MQA102T	<p>1. Student shall be able to understand the cGMP aspects in a pharmaceutical industry.</p> <p>2. Student shall be able to understand the importance of documentation.</p> <p>3. Student shall be able to understand the scope of quality certifications applicable to Pharmaceutical industries.</p> <p>4. Student shall be able to understand the responsibilities of QA department.</p> <p>5. Student shall be able to understand the responsibilities of QC department.</p> <p>6. Student shall be able to understand GLP and regulatory Affairs.</p>



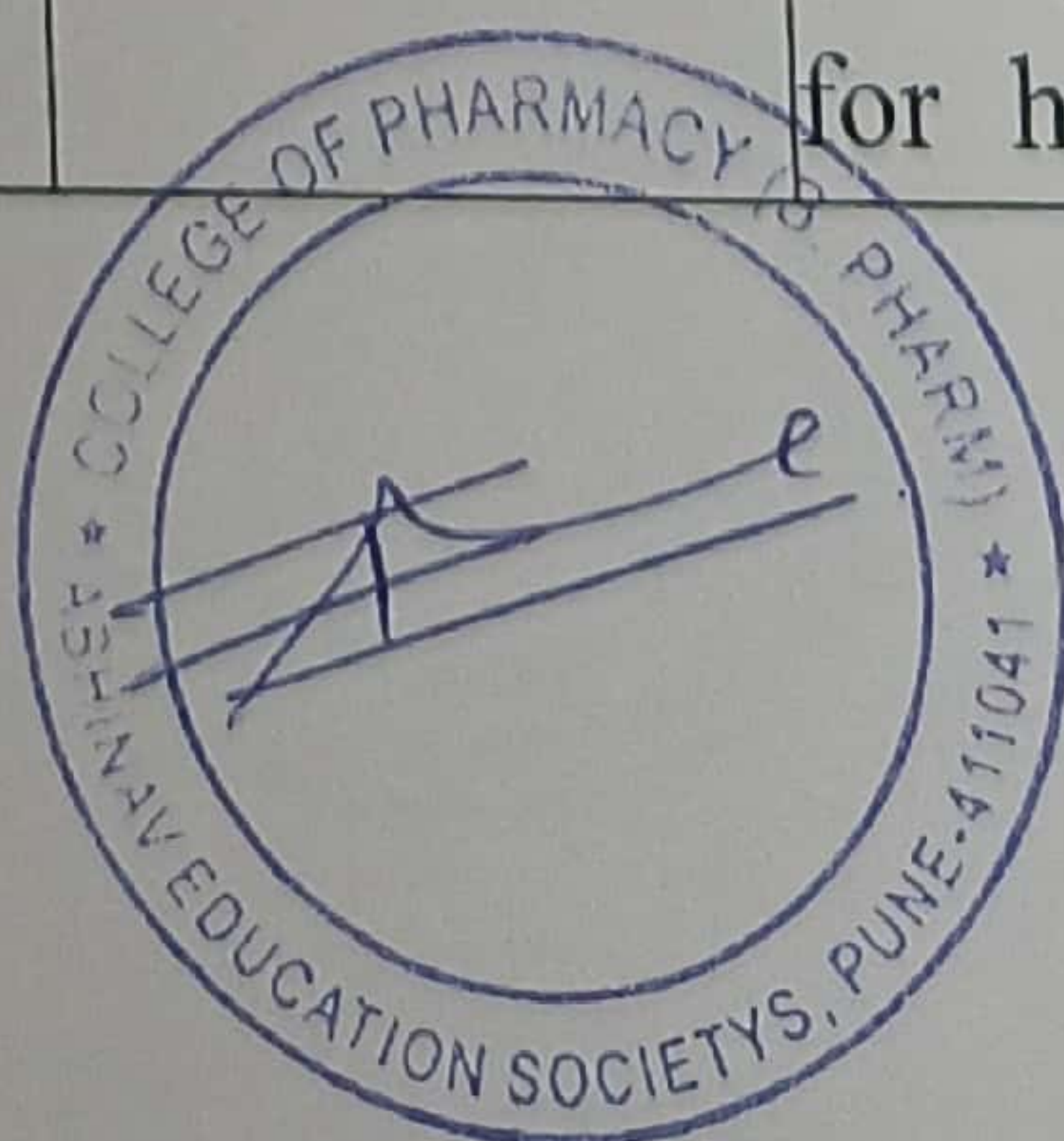


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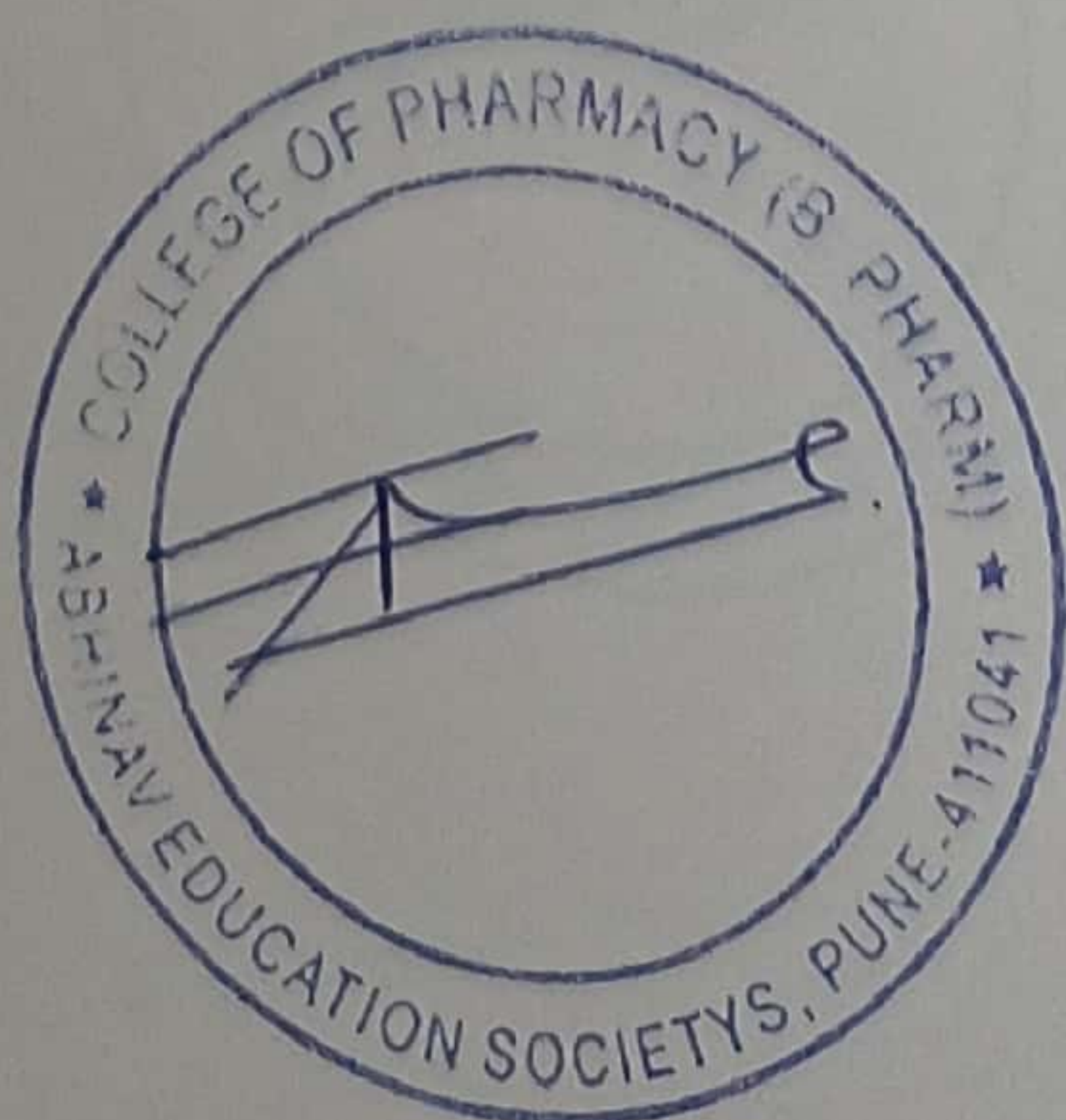


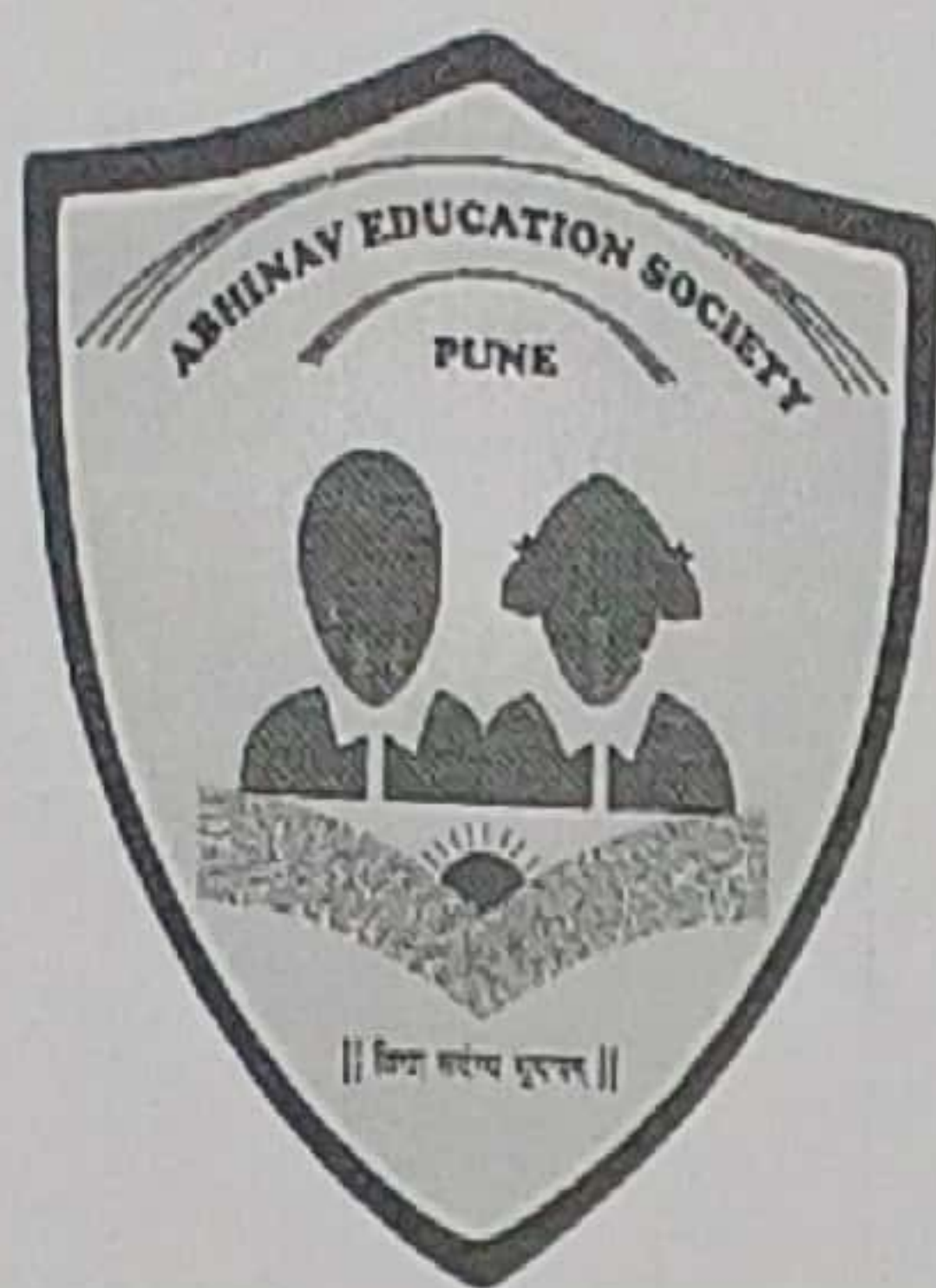
4		Product development and Technology Transfer	MQA103T	<ol style="list-style-type: none">1.To apply the knowledge to develop new procedures of their own design of Pilot layouts2. Student shall be able to understand the Quality by design practices of sterile and non sterile dosage forms.3. Student shall be able to understand the practices of packaging technology.4.Student shall be understand the Regulatory requirements in drug development stages.5. Students shall understand the phase of technology transfer.
5		Pharmaceutical Quality Assurance Practical I	MQA104P	<ol style="list-style-type: none">1.To understand the process of new product development2. To understand aspects in pre-formulation studies, pilot scale up and pharmaceutical packaging3. To apply the necessary knowledge to transfer technology from R&D to actual manufacturing.4. To evaluate the necessary information for technology transfer in the pharmaceutical industry
6		Hazards and Safety Management	MQA201T	<ol style="list-style-type: none">1. To understand the energy resources in the to make eco-friendly industry environment.2. The course knowledge useful to Find hazards in work atmosphere.3. It creates the passage to understand, Determine and to take control measures to eliminate or minimize the level of the risks.4. It supports the student to recognize the control measures to eliminate or minimize the level of the risks.5. It provides platform for formal process for hazard identification, risk assessment





				and control to effectively manage workplace and safety hazards. 6.It develop proper understanding in the stages of risk assessment.
7		Pharmaceutical Validation	MQA202T	1. The Students learn on the importance of validation. 2. The student learns on the importance of patent and intellectual property rights. 3. The students are trained on the qualification aspects of instruments. 4. The importance of calibration to be performed for the instruments. 5.The various validation aspects to be carried out in the industry. 6.The students gain knowledge on how validation are carried for various components. Such as instrument validation, cleaning validation and process validation.
8		Audit and Regulatory Compliance	MQA203T	1. The student gain knowledge on the importance of auditing in pharmaceutical preparation. 2. The various forms of auditing are and how an audit process happens are briefed to the students. 3. Preparation of various audit checklists for the auditing, when and what are the areas the auditing to be carried is taught to the student. 4. The Reporting form of the auditing process is taught to the student. 5. The student practices the auditing process and reporting process.



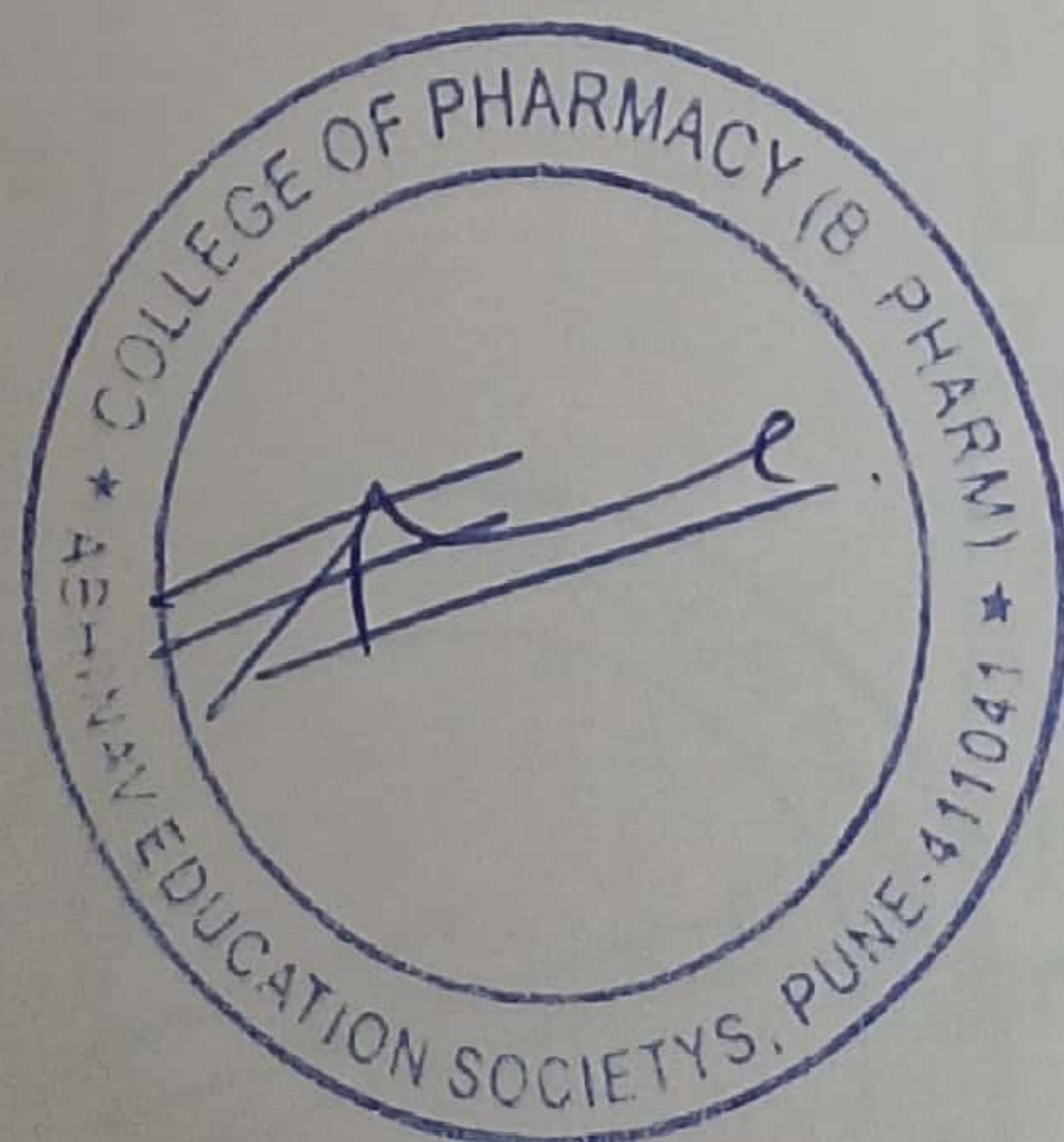


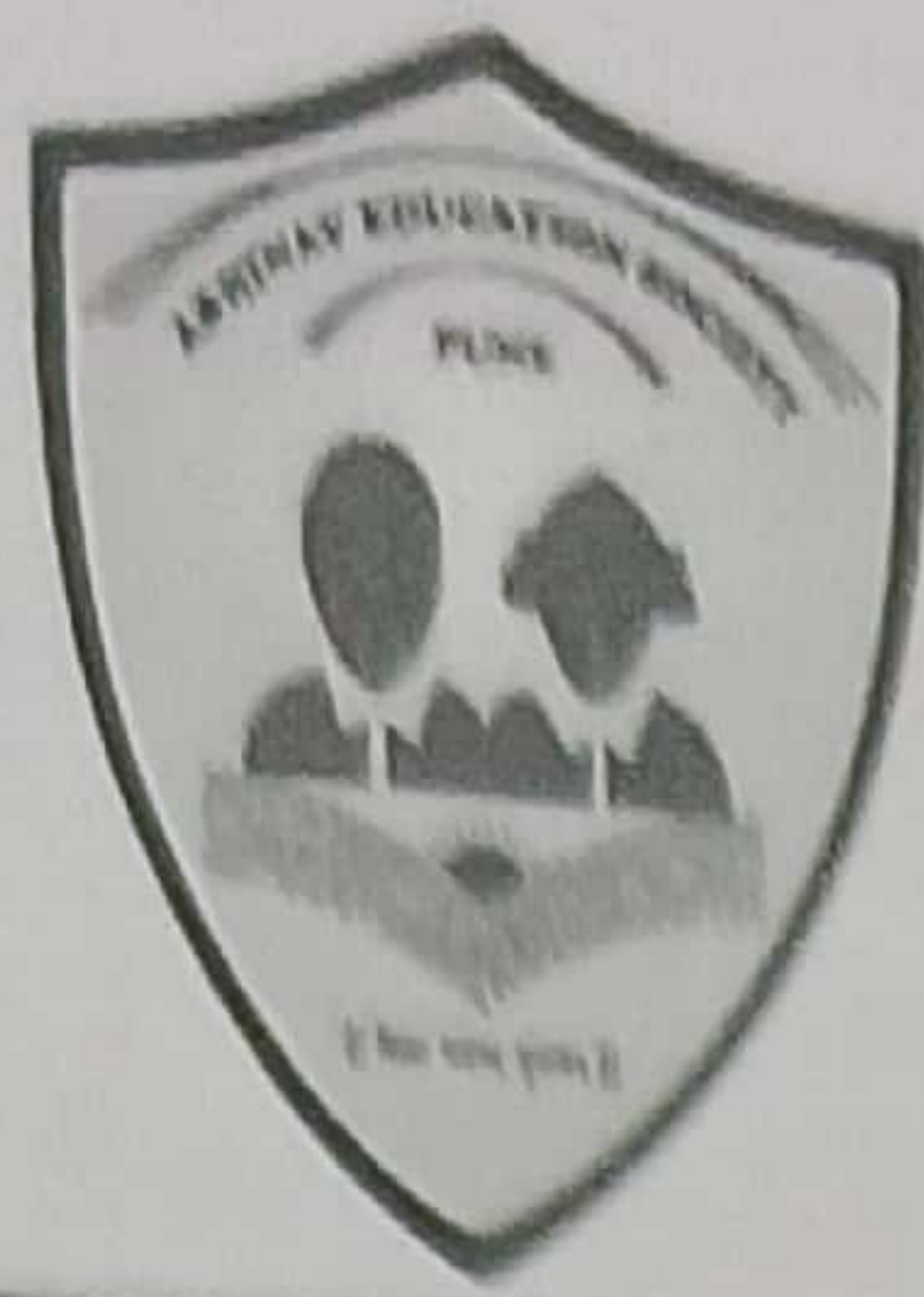
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9		Pharmaceutical Manufacturing Technology	MQA204T	<ol style="list-style-type: none">1. Student shall be able to understand the common practice in the pharmaceutical industry developments.2. Student shall be able to understand the practices of aseptic process technology.3. Student shall be able to understand the practices of non sterile manufacturing technology.4. Student shall be able to understand the practices of packaging technology.5. Student shall be able to understand understanding of principles and implementation of Quality by design (QbD).6. Student shall be able to understand understanding of principles and implementation of process analytical technology (PAT) in pharmaceutical manufacturing.
10		Pharmaceutical Quality Assurance Practical II	MQA205P	<ol style="list-style-type: none">1. To perform analysis of contaminants and related substances in pharmaceuticals2. To perform qualifications of instruments and processes in pharmaceutical manufacturing and analysis3. To prepare checklists and design layouts4. To apply the quality tools (QbD and PAT) for effective quality improvement of pharmaceuticals





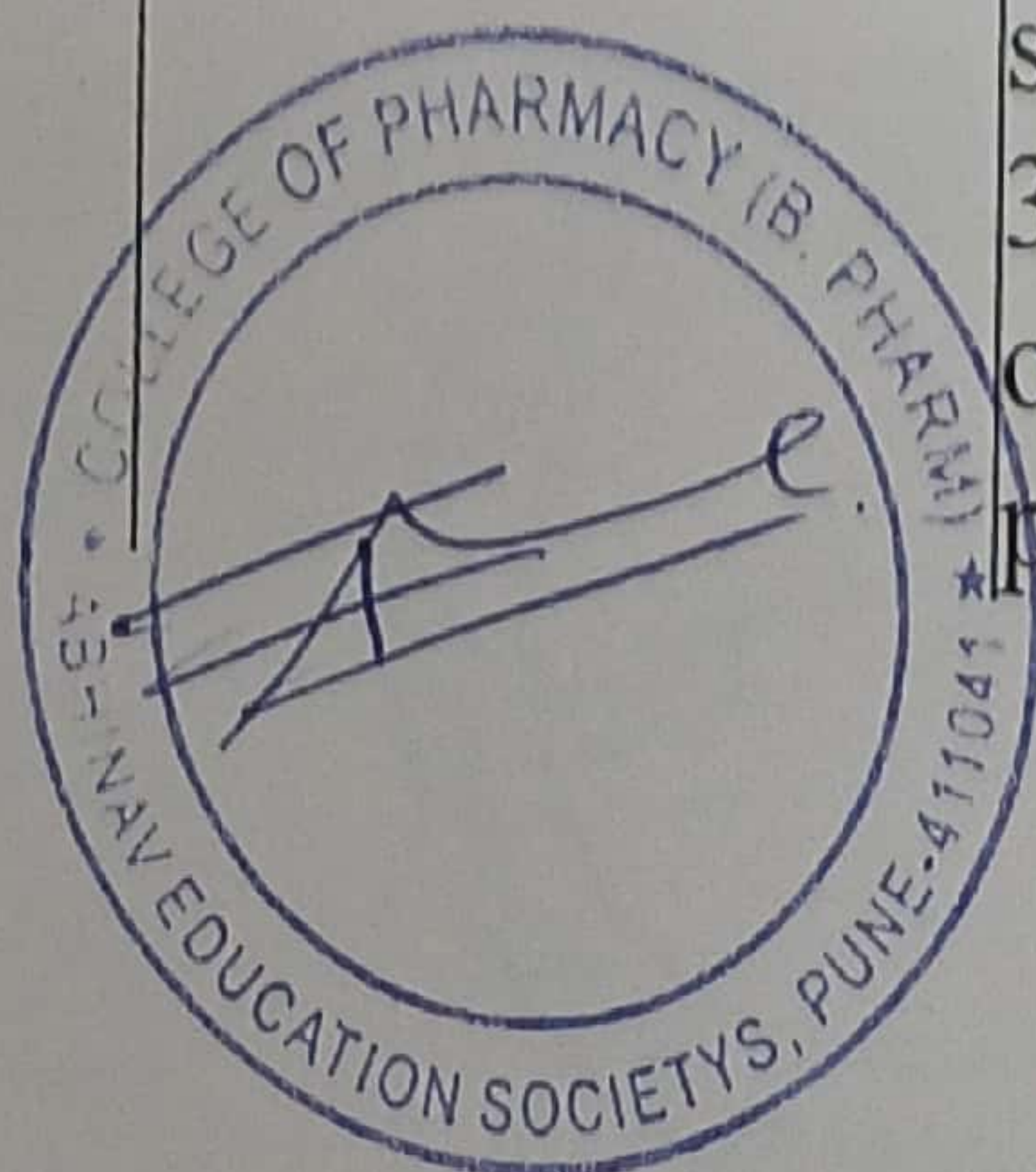
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COURSE OUTCOMES FOR B.PAHRMACY (PRACTICE)

Sl. No.	Name of the Program	Name of the Course	Subject Code	Course Outcome
1	B.Pharmacy (Practice)	Pharmacy Practice II	BPP101T	<p>1. This course will provide an in-depth knowledge of the human pathological processes and their effects on homeostasis.</p> <p>2. More emphasis is laid on the inter-relationships among organ systems and their deviation from homeostasis.</p> <p>3. The students will be able to demonstrate and discuss intricate details of pathophysiological mechanisms and disease progression, upon completion of this subject.</p> <p>4. Pharmacotherapeutics mainly refers to use of drugs for prevention, treatment, diagnosis and modification of normal functions.</p> <p>5. Inclusion of pharmacotherapeutics in combination with pathophysiology will aid the linking of biochemical and microbiological components of disease to pharmacokinetics and pharmacodynamics of drugs.</p> <p>6. Upon completion of this element, the students will be able to understand the therapeutic approach related to disease management, controversies in drug therapy (if any) and the significance of subjective drug therapy customization.</p>
2		Pathophysiology and Pharmacotherapeutics II	BPP102T	<p>1. This course will provide an in-depth knowledge about Pathophysiology, therapeutics for the specific disease or disorder.</p> <p>2. It helps to proper regulation for the patient specific treatment.</p> <p>3. Practicing pharmacists will have the opportunity to review the case notes or prescriptions in their practicesetting and able</p>



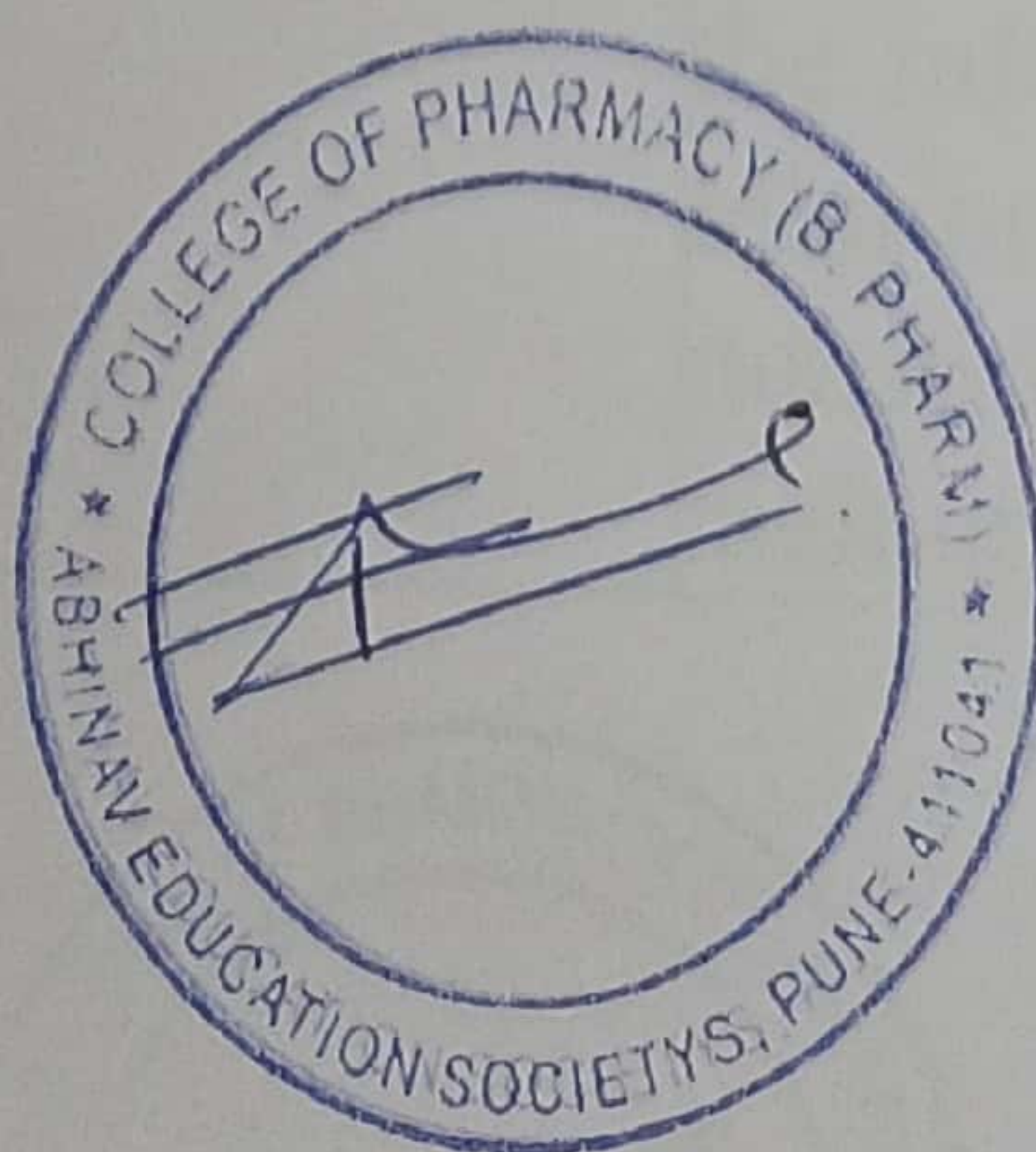


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			<p>to identify and resolve the drug related problems. This will ensure the improved patient care and decreases the unnecessary health care expenditure. This course helps to understand professional role of pharmacist in community, hospital and clinical pharmacy areas.</p> <p>4. It helps to understand the professional responsibilities of the pharmacist.</p> <p>5. Upon completion of this element, the students will be able to understand different approaches in pathophysiology.</p>
3	Pharmacy Practice I	BPP103T	<p>1. This course will provide an in-depth knowledge about clinical pharmacy, hospital pharmacy and community pharmacy.</p> <p>2. It helps to provide various patient care services to improve patient's health through counseling, helps screening services and education programs.</p> <p>3. In hospital settings, pharmacist can ensure appropriate dispensing, education to patient and provide all hospital pharmacy services including clinical pharmacy services such as drug information and ADR reporting.</p> <p>4. This course helps to understand professional role of pharmacist in community, hospital and clinical pharmacy areas.</p> <p>5. It helps to understand the professional responsibilities of the pharmacist.</p> <p>6. Upon completion of this element, the students will be able to understand different approaches in practice of pharmacy.</p>



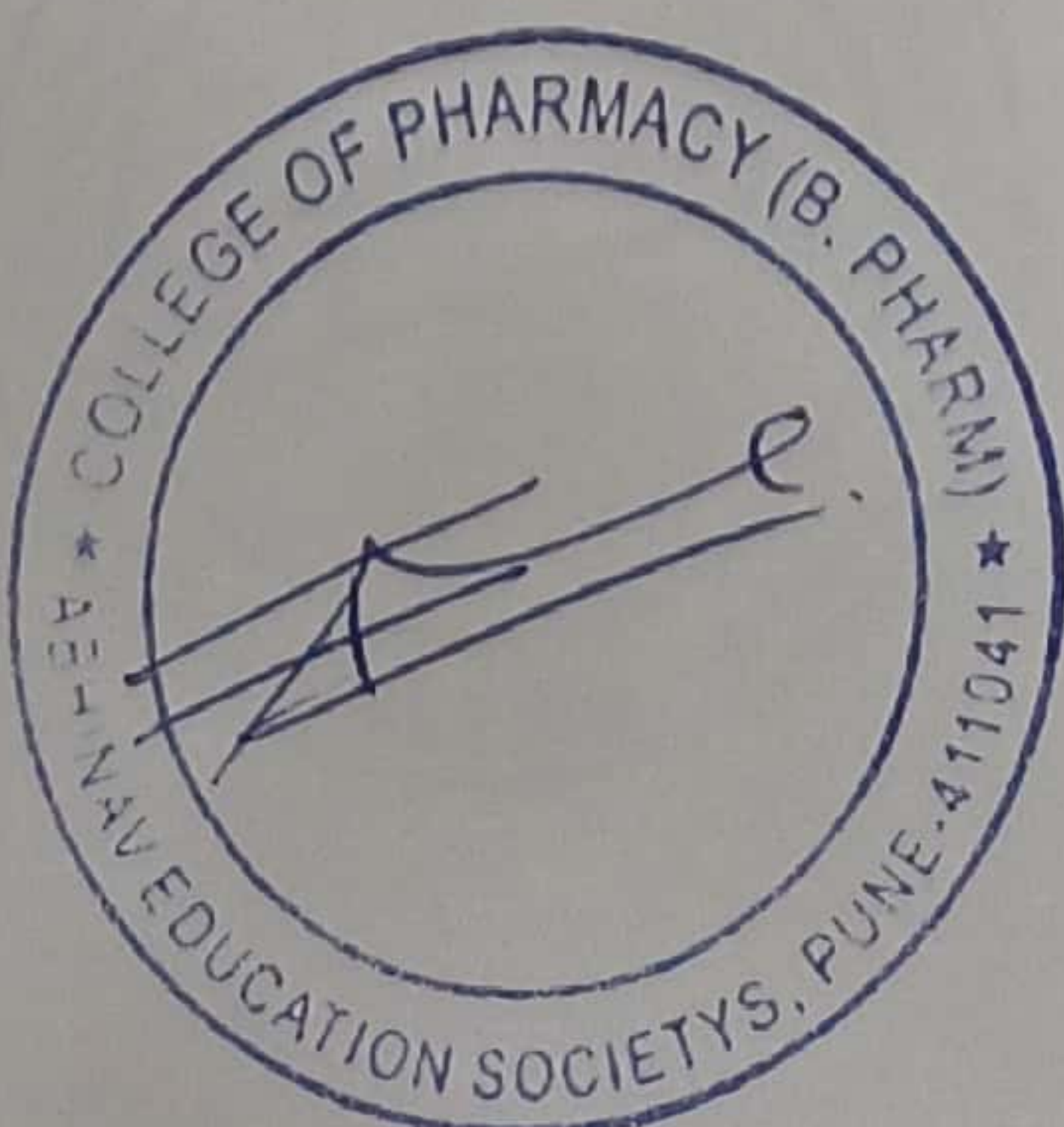


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4		Pharmacy Practice II	BPP104T	<p>1. This course will provide an in-depth knowledge about professional roles of pharmacists in community, hospitals and clinical pharmacy areas.</p> <p>2. It helps to provide various methods for improving better knowledge for upbuilding of hospital supplies for inventory management.</p> <p>3. In hospital various methods of drug distributions which are helpful for better administration and management, also for narcotic and psychotropic substances.</p> <p>4. This course helps to understand professional role of pharmacist in community as well as in drug store for better understanding of prescriptions as well as for cooperating with the patients for OTC medications.</p> <p>5. It helps to understand the professional responsibilities of the pharmacist for better patient care by patient counselling and many other patient awareness programs for patient's pharmaceutical care.</p> <p>6. The students will be able to understand different approaches for better health screening methods and also for different interpretation data for various organs functioning abilities.</p>
5		Social Pharmacy I	Subject Code: BPP105T	<p>1. This course will help to understand the concept of prevention and control of disease and social cause of disease, social problems of the sick and social culture related to health and disease, Impact of urbanization on health and disease, poverty and health.</p> <p>2. Understand the social responsibility of the pharmacists in the society, provide professional services to the patients.</p> <p>3. The social health education will provide the information to student regarding food in relation to nutrition and health, balanced diet, nutritional deficiencies, vitamin deficiencies, malnutrition and its prevention, nutritional</p>



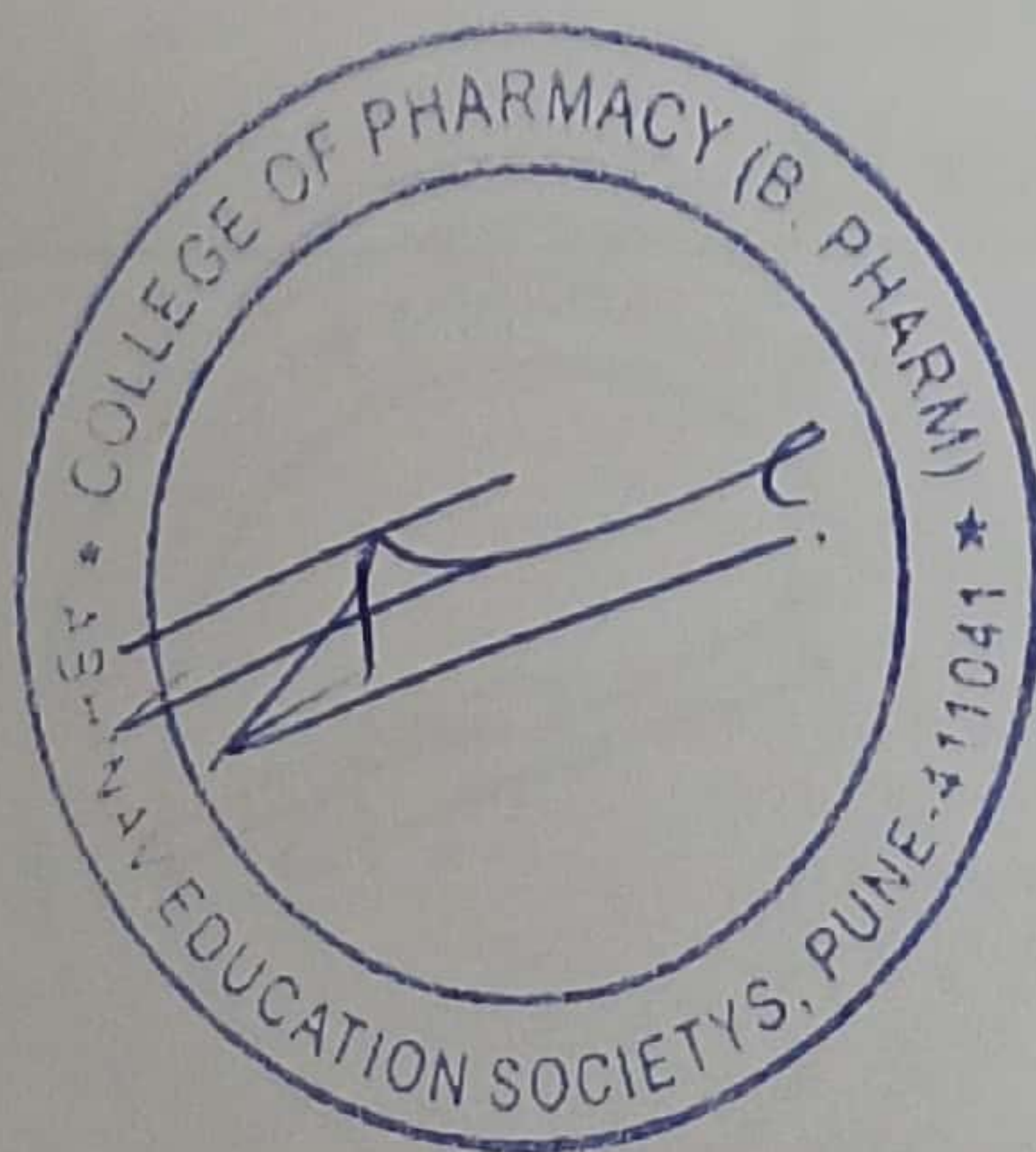


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			<p>recommendation for prevention and control of disease such hypertension, diabetes mellitus, cancer and increase the awareness about the drug addiction, drug substance abuse.</p> <p>4. Students will demonstrate knowledge of and ability to use principles of therapeutics, quality improvement, communication, economics, health behavior, social and administrative aspects, health policy and legal issues in the practice of pharmacy.</p> <p>5. The study of National health programs, its objectives, functioning and outcomes of the national mental health programme, universal immunization programme, national programme of control blindness, national health intervention programme for mother and child, national family welfare programme, national tobacco control programme, programme for the health care for elderly patient, help to student to increase the awareness in society.</p>
6		Applied Pharmaceutics	BPP106T <p>1. This course will help to understand profession of Pharmacy in India & Pharmacopeia and its development.</p> <p>2. Learn parts and handling of prescription, posology & dose calculation of drug in children. Different types of dosage form.</p> <p>3. Understand the social responsibility of the pharmacists in the society, provide professional services to the patients</p> <p>4. Understand requirement, formulation and evaluation of suppositories and pessaries</p> <p>5. Understand the mechanisms of drug penetration and also the factors influencing permeation through transdermal route</p> <p>6. Explain the formulation and evaluation of semisolid preparation such as ointment, gel cream etc.</p>



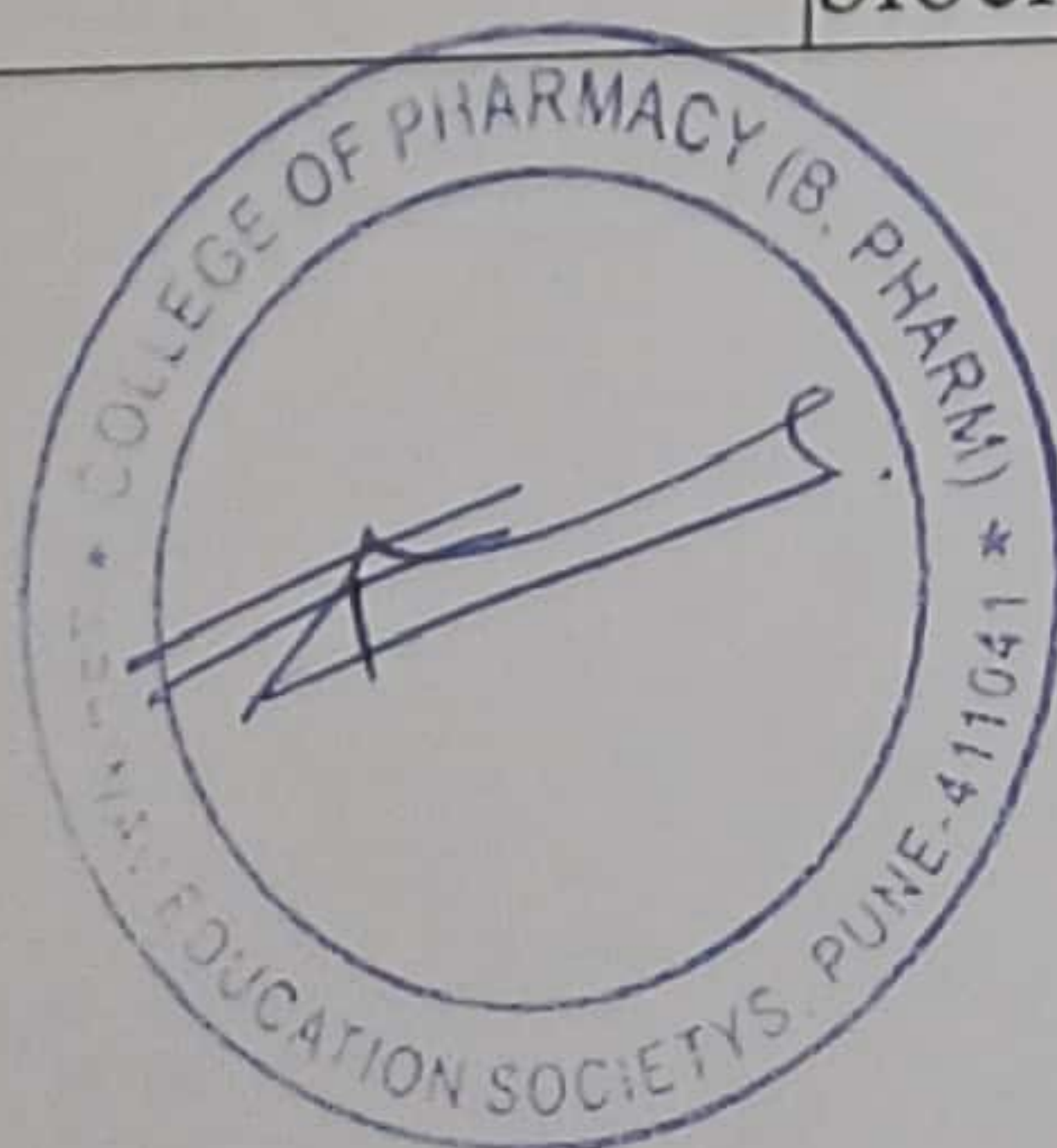


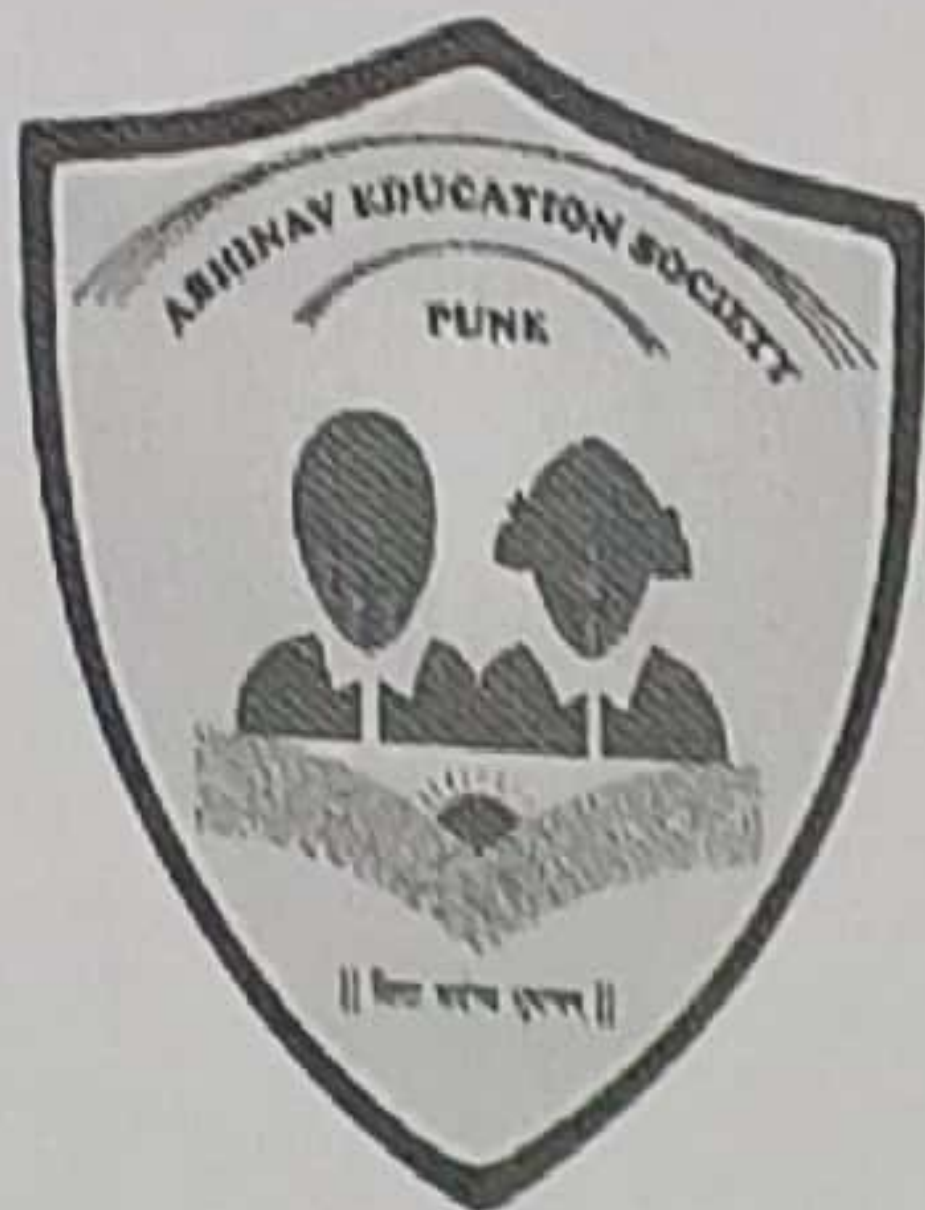
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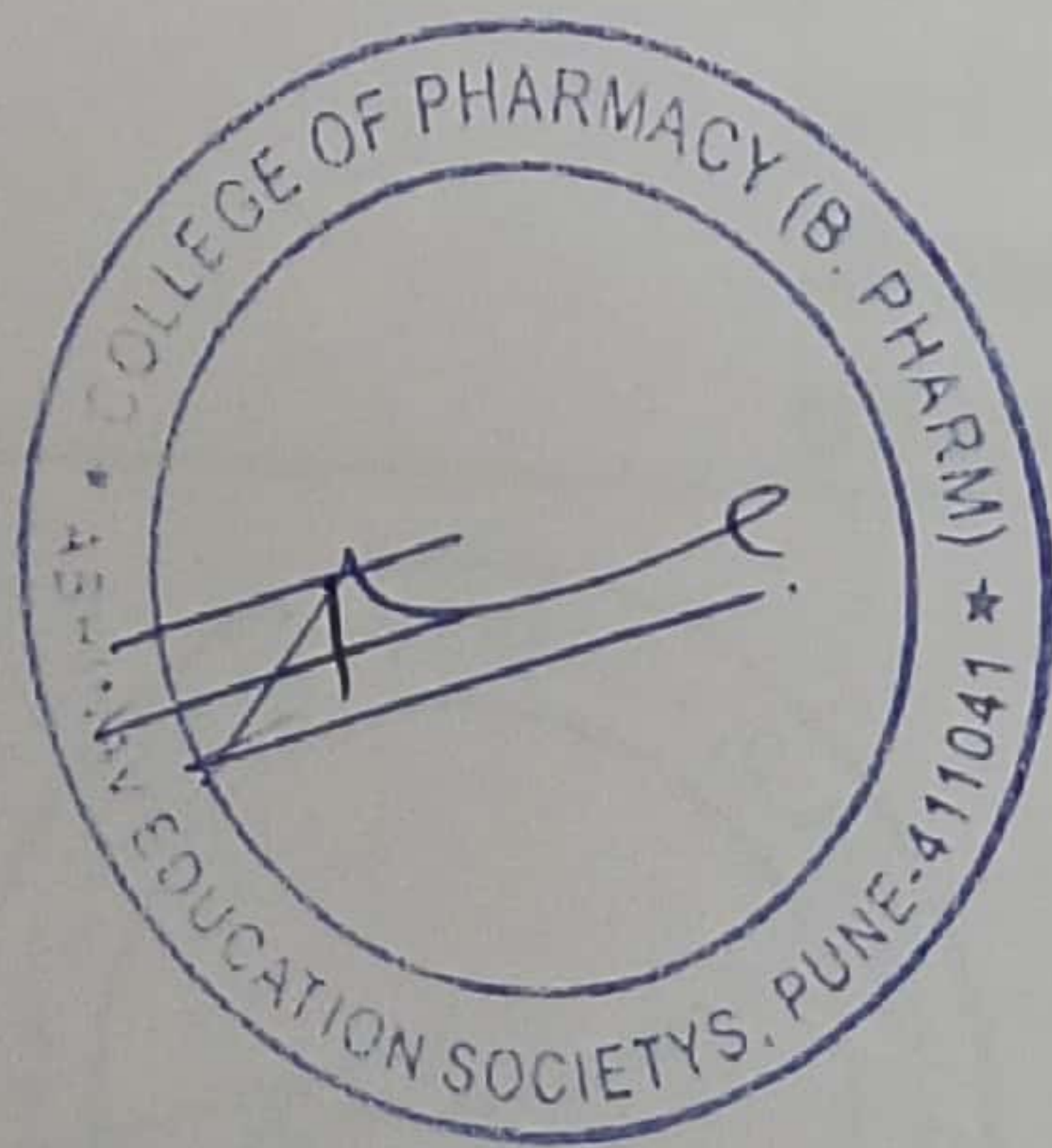


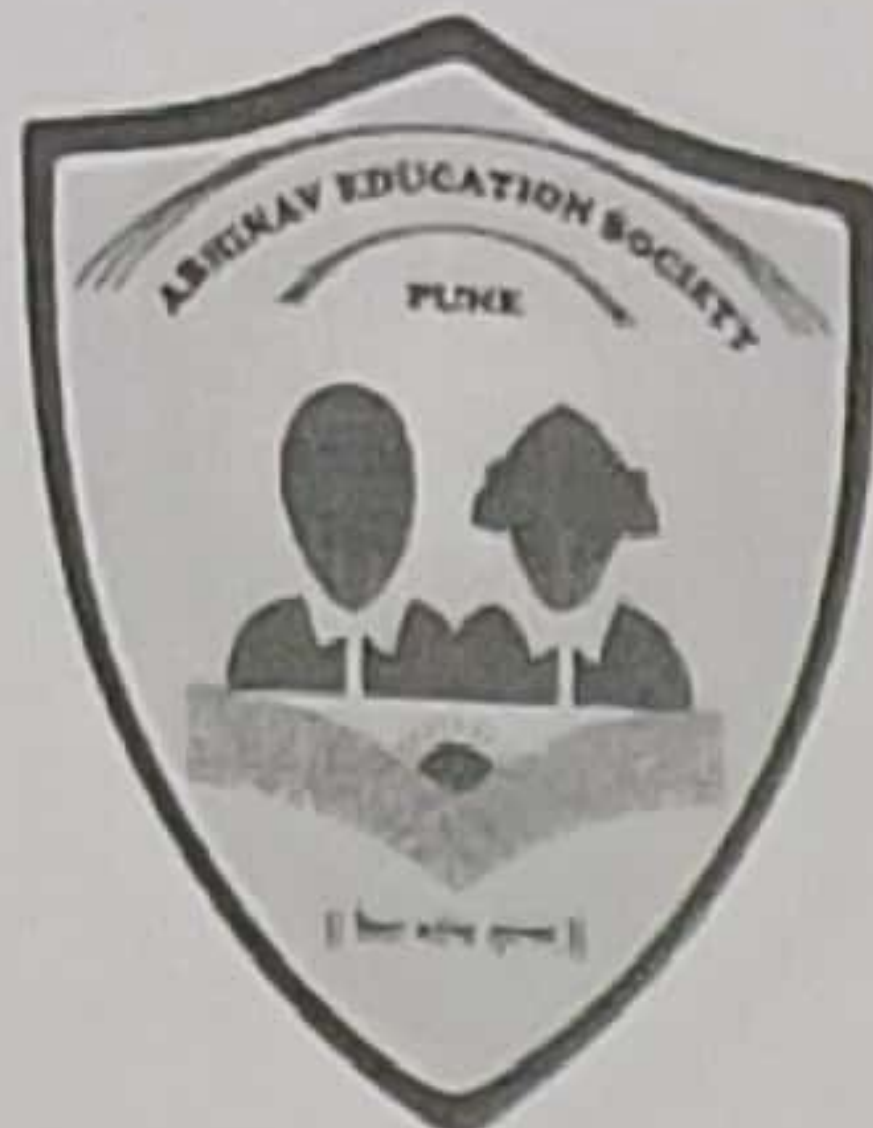
7		Pathophysiology and Pharmacothera peutics III	BPP201T	<ol style="list-style-type: none">1. This course will provide an in-depth knowledge about Pathophysiology, therapeutics for the specific disease or disorder.2. It helps to proper regulation for the patient specific treatment.3. Practicing pharmacists will have the opportunity to review the case notes or prescriptions in their practice setting and able to identify and resolve the drug related problems. This will ensure the improved patient care and decreases the unnecessary health care expenditure. This course helps to understand professional role of pharmacist in community, hospital and clinical pharmacy areas.4. It helps to understand the professional responsibilities of the pharmacist.5. Upon completion of this element, the students will be able to understand different approaches in pathophysiology.
8		Pathophysiology & Pharmacothera peutics IV	BPP202T	<ol style="list-style-type: none">1. This course provides a thorough examination of human pathogenic processes and the impact they have on homeostasis. The interrelationships between organ systems in departures from homeostasis are highlighted.2. Students should be able to demonstrate thorough understanding of pathophysiology at the end of the course.3. The aetiology, physical symptoms, prognosis, consequences, and treatment of frequently occurring illnesses are among the subjects covered in the course.4. The use of medications for prevention, treatment, diagnosis, and change of normal functioning is referred to as pharmacotherapeutics.5. Pathophysiology and the inclusion of pharmacotherapeutics will help relate the biochemical and microbiological aspects of



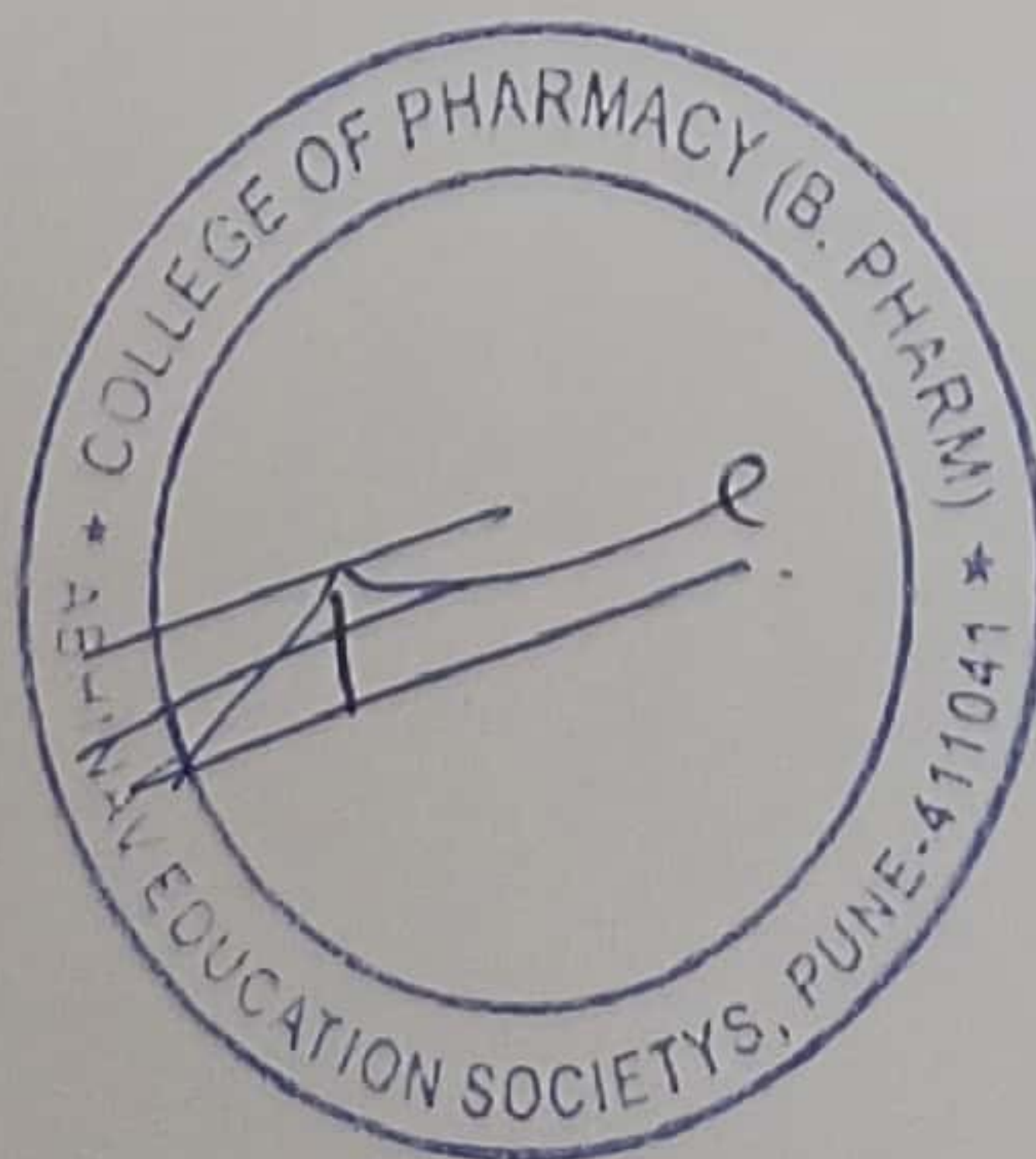


			illness to the pharmacokinetics and pharmacodynamics of medications. 6. After completing this portion, students will be able to comprehend the therapeutic strategy for managing disease, discussions around drug therapy, and the necessity of subjective drug therapy modification.
9		Pharmacy Practice III	BPP203T 1. This course will provide an in-depth knowledge about API, source of API, Poisons information, Pharmacovigilance, methods of taking medications and its adherence, importance of communication for pharmacists, OTC medications and non-pharmacological treatments for various disease conditions, different hospital supplies and importance of veterinary pharmacy in drug stores. 2. It helps to provide information about different API informations from various platforms like drug magazines, drug bullets, etc. 3. Even also the information regarding various poison related to patient health care services provides various poison information Centre. 4. Knowledge regarding adverse drug reaction gives vary huge ideas of the patients having problems while taking the medications, its assessment, evaluation and monitoring provides the good patient health care, and it's an important in study of pharmacovigilance.





10		Pharmacy Practice IV	BPP204T	<ol style="list-style-type: none">1. This course will provide an in-depth knowledge about health accessories used in hospitals.2. It helps to provide information about medical gases used in hospitals.3. From this, students will learn about different phases of clinical trials and roles and responsibilities of the personnel involved therein.4. This course helps to understand professional role of pharmacist in community, hospital and clinical pharmacy areas.5. It helps to understand the professional responsibilities of the pharmacist.6. Upon completion of this element, the students will be able to understand different approaches in practice of pharmacy and advances in the field of pharmacy.
11		Social Pharmacy II	BPP205T	<ol style="list-style-type: none">1. This course will help to understand the concept of prevention and control of disease and social cause of disease, social problems of the sick and social culture related to health and disease, Impact of urbanization on health and disease, poverty and health.2. Understand the social responsibility of the pharmacists in the society, provide professional services to the patients3. The social health education will provide the information to student regarding food in relation to nutrition and health, balanced diet, nutritional deficiencies, vitamin deficiencies, malnutrition and its prevention, nutritional recommendation for prevention and control of disease such hypertension, diabetes mellitus, cancer and increase the awareness about the drug addiction, drug substance abuse.





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College of Pharmacy (B. Pharm), Narhe, Pune-41.



12		Pharmaceutical Jurisprudence	BPP206T	<ol style="list-style-type: none">1. The Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.2. Various Indian pharmaceutical Acts and Laws.3. The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals.4. The code of ethics during the pharmaceutical practice.
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