

# Pharmacology for Health Professions

## Course Outline

### COURSE DESCRIPTION

This course provides a foundation for the use of medications across multiple health care professions. It focuses on a general understanding of the actions and use of various groups of pharmacologic agents. Included in the course is an overview of medications, the effect on different organ systems and the disease process, therapeutic effects, drug calculations, anatomy and physiology, and medical terminology. The course is designed to prepare students to further their education in multiple health care fields. Students will have the opportunity to participate in work based learning/Community Classroom.

### COURSE CODES

<b>ROP:</b>	<b>BUSD:</b>	<b>HLPUSD:</b>	<b>RUSD:</b>
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### COURSE INFORMATION

<b>Sequence</b>	Capstone	<b>Articulation</b>	
<b>Prerequisites</b>	Medical Core	<b>A-G Approval</b>	G- Interdisciplinary
<b>Course Length</b>	180 hrs classroom/ 90 hrs CC	<b>CTSO's</b>	HOSA
<b>Board Approval</b>		<b>Certifications</b>	
<b>Advisory Date</b>			

### OCCUPATIONS FOR IDENTIFIED PATHWAY

<b>Industry Sector</b>	Health Science and Medical Technology	<b>Occupations by Level of Education (O*NET)</b>	
<b>Career Pathway</b>	Patient Care - 198	<b>High School</b>	31-9095 Pharmacy Aides 31-9099 Healthcare Support Workers, All Other
<b>CBED Title &amp; Code</b>	Therapeutic Services - 4284	<b>Postsecondary:</b> Certification and/or AA Degree	31-1011-Home Health Aids 29-2061-Licensed Practical and Licensed Vocational Nurse 31-9092 Medical Assistants 29-2052- Pharmacy Technicians
<b>US Department of Education (USDOE) Career Cluster)</b>	Health Science	<b>College University</b> Bachelor's Degree or Higher	29-1051 Pharmacists 29-1141 Registered Nurses

**COURSE OUTLINE****Unit 1 - Employability Skills****1.0 Career Preparation**

- A. Define professionalism, including punctual attendance, positive attitude, responsibility, initiative, honesty, and respect for others.
- B. Identify appropriate characteristics, attitude, and appearance.
- C. Describe the importance of prioritizing tasks and meeting deadlines.
- D. Display determination, enthusiasm, and commitment.

**1.1 Understanding principles of effective interpersonal skills, including group dynamics, conflict resolution, and negotiation.**

- A. Use teamwork.
- B. Explain laws dealing with sexual harassment in the workplace.

**1.2 Understand the importance of good academic skills.**

- A. Recognize the importance of good reading, writing, and math skills.
- B. Apply estimation, measurement, and calculations skills on the job.
- C. Read, write, give, and follow instructions.
- D. Apply critical thinking and problem-solving skills in workplace situations.
- E. Identify math skills and demonstrate skill accuracy in measurements.

**1.3 Understand principles of effective communication.**

- A. Communicate effectively orally and in writing.
- B. Identify non-verbal communication techniques.

**1.4 Understand occupational safety issues and observe safety rules.**

- A. Identify job site hazards.
- B. Describe a safe work environment.
- C. Demonstrate safe use of tools and equipment.

**1.5 Understand career paths and strategies of obtaining employment.**

- A. Identify career paths and further training.
- B. Apply effective job search skills, including locating employment information. Fill out application forms completely and correctly.
- C. Prepare a resume and identify effective interviewing techniques by participating in a mock interview.

**1.6 Understand and adapt to changing technology.**

- A. Uses and maintains equipment appropriately.
- B. Explain the importance of lifelong learning in adapting to changing technology.

**COURSE OUTLINE****Unit 2 - Introduction to Pharmacology**

- A. Identify common routes of administration.
- B. Describe various delivery methods of medications.
- C. Explain the difference between chemical, generic, and brand names.
- D. Demonstrate research techniques for obtaining drug information from established drug references sources.
- E. Define what is meant by an adverse drug reaction and list examples.
- F. Define common terms related to pharmaceuticals.
- G. Describe the components of the drug cycle, absorption, distribution, metabolism, and excretion.
- H. Explain the benefits, advantages, and disadvantages of different routes of administration.
- I. Describe the advantages and disadvantages of common dosage forms.
- J. List common sources of medications.
- K. Explain the approval process for new medications.
- L. Identify factors that influence the effects of medications.
- M. Describe medication concerns for special populations. (i.e. Pediatrics, Elderly, Obese, Pregnant.)
- N. Explain strategies for maximizing therapeutic effects of drug therapy and minimizing adverse effects in drug therapy.
- O. Define poly-pharmacy and its relevance in managing drug therapy in older adults.

**Unit 3 - Medications**

- A. Identify common over the counter medications and their uses.
- B. Identify common medication by brand and generic name.
- C. List commonly used controlled medications and their schedule.
- D. Differentiate between major classifications of medications.
- E. List common uses, side effects, and interactions of medications
- F. Compare and contrast traditional medications and alternative therapies.

**Unit 4 – Anatomy and Physiology**

- A. List the major body systems and give general functions of each: Integumentary, Muscular, Skeletal, Nervous (Including senses), Cardiovascular, Endocrine, Lymphatic, Immune, Respiratory, Gastrointestinal, Urinary, and Reproductive.
- B. Describe common diseases and conditions that affect each body system, including pathophysiology, signs, symptoms, and treatment options.
- C. Define common medical terms related to each body system.
- D. Describe the location of the major structures of each body system.
- E. Explain the actions of medications on various body systems.

**COURSE OUTLINE****Unit 5 – Law and Ethics**

- A. Describe the schedules for controlled medications.
- B. Describe the implications of the Health Insurance Portability and Accountability Act (HIPAA) and its impact on the health care system.
- C. Describe the purpose of state and federal regulatory agencies related to healthcare.
- D. Explain the need for medical code of ethics.
- E. Identify common laws and regulations that affect healthcare.

**Unit 6 - Dispensing Medications**

- A. Identify the key elements of a prescription.
- B. Interpret labels found on medication containers.
- C. Decipher commonly used abbreviations, codes, and symbols used on prescriptions.
- D. Correctly transcribe prescriptions and medication orders.
- E. Describe the role of health care professionals in preventing medication errors.
- F. Identify storage and handling requirements for medications.
- G. Explain methods to help educate patients within various health care professions scope of practice.
- H. Demonstrate proper dispensing procedures for various types of medications.
- I. Accurately measure liquid medications oral and parenteral.
- J. Describe methods to monitor the outcomes of drug therapy.

**Unit 7 – Dosage Calculations**

- A. Identify the measurement terms used in apothecary, metric, and household systems.
- B. Convert between metric, apothecary and household systems.
- C. Utilize mathematical skills to solve dosage calculations accurately.
- D. Accurately add, subtract, multiply, and divide whole numbers, decimals, and fractions.
- E. Convert between decimals, percentage, fractions, and ratios.
- F. Convert between Fahrenheit to Celsius
- G. Determine safe dosages for infants and children.
- H. Convert between Roman and Arabic numerals.
- I. Convert between standard and international/military time.
- J. Calculate amount to administer according to dose.
- K. Calculate the amount needed to fill a prescription or medication order.
- L. Calculate the days' supply of a medication order.

**COURSE OUTLINE****Unit 8 – Career Explorations**

- A. Describe the role pharmacology plays in various health care professions.
- B. Identify the purpose of various health care facilities and the role of pharmacology in those settings.
- C. Describe the training and educational requirements for various health care professions related to pharmacology.

KEY ASSIGNMENTS					
Assignment	Competency	Career Ready Practices	Anchor Standards	Pathway Standards	CCSS
1. Students will participate in mock interviews that represent current industry practices (e.g., skills demonstrations, resumes, applications, portfolios, personal websites, etc.).		2 3 10	2 3		LS 9-10, 11-12.6 SLS 11-12.2
2. Students will work in groups to develop a game or activity that teaches fellow students the basics of a body system using proper medical terminology.*		1 2 9 10	2	B 5.0	LS 9-10, 11-12.6 RLST 11-12.4
3. Students will correctly transcribe and prepare a minimum of 5 prescriptions with 100% accuracy; students will then document the use of the drug, common side effects or warnings, and any other pertinent information. The prescriptions will incorporate the use of translating abbreviations, dosage calculations, and drug knowledge.*		1 2 4	4 5	Patient Care B 3.0 B 5.0  Healthcare Administrative C 7.0	RLST 11-12.4 WHSST 11-12.2 WS 11-12.7  N-Q 1 N-Q 2
4. Students will research and electronically present information based on healthcare laws and regulations (past and present) that affect the use of medications. The presentation will include historical information and the need for medication regulation.*		1 2 11	2 4 5 8	B 5.0	LS 9-10, 11-12.6
5. Students will research, evaluate, and document a current example of a HIPAA violation.*		1 2 5 11	2 4 5 8	Healthcare Administrative C 14.0	LS 9-10, 11-12.6 WHSST 11-12.2 WS 11-12.7
6. Students will present information on popular medications. Presentations will include information on indications, contraindications, dosage forms, dosage strengths, side effects, and other pertinent information.					

\* = UC a-g required assignment

**ANCHOR STANDARDS****1.0 Academics**

Analyze and apply appropriate academic standards required for successful industry sector pathway completion leading to post-secondary education and employment. Refer to Health Science and Medical Technology academic alignment matrix for identification of standards.

**2.0 Communications**

Acquire and Accurately use Health Science and Medical Technology sector terminology and protocols at the career and college readiness level for communicating effectively in oral, written, and multimedia formats.

**3.0 Career Planning and Management**

Integrate multiple sources of career information from diverse formats to make informed career decisions, solve problems, and manage personal career plans.

**4.0 Technology**

Use existing and emerging technology, to investigate, research, and produce products and services, including new information, as required in the sector workplace environment.

**5.0 Problem Solving and Critical Thinking**

Conduct short, as well as more sustained, research to create alternative solutions to answer a question or solve a problem unique to the sector using critical and creative thinking, logical reasoning, analysis, inquiry, and problem-solving techniques.

**6.0 Health and Safety**

Demonstrate health and safety procedures, regulations, and personal health practices and determine the meaning of symbols, key terms, and domain-specific words and phrases as related to Health Science and Medical Technology sector workplace environment.

**7.0 Responsibility and Flexibility**

Initiate, and participate in, a range of collaborations demonstrating behaviors that reflect personal and professional responsibility, flexibility, and respect in the sector workplace environment and community settings.

**8.0 Ethics and Legal Responsibilities**

Practice professional, ethical, and legal behavior, responding thoughtfully to diverse perspectives and resolving contradictions when possible, consistent with applicable laws, regulations, and organizational norms.

**9.0 Leadership and Teamwork**

Work with peers to promote divergent and creative perspectives, effective leadership, group dynamics, team and individual decision making, benefits of workforce diversity, and conflict resolution.

**10.0 Technical Knowledge and Skills**

Apply essential technical knowledge and skills common to all pathways in the Health Science and Medical Technology sector, following procedures when carrying out experiments or performing technical tasks.

**11.0 Demonstration and Application**

Demonstrate and apply the knowledge and skills contained in the industry-sector anchor standards, pathway standards, and performance indicators in classroom, laboratory, and workplace settings, and the career technical student organization.

## CAREER READY PRACTICES

- 1 - Apply appropriate technical skills and academic knowledge.
- 2 - Communicate clearly, effectively, and with reason.
- 3 - Develop an education and career plan aligned to personal goals.
- 4 - Apply technology to enhance productivity.
- 5 - Utilize critical thinking to make sense of problems and persevere in solving them.
- 6 - Practice personal health and understand financial well-being.
- 7 - Act as a responsible citizen in the workplace and the community.
- 8 - Model integrity, ethical leadership, and effective management.
- 9 - Work productively in teams while integrating cultural/global competence.
- 10 - Demonstrate creativity and innovation.
- 11 - Employ valid and reliable research strategies.
- 12 - Understand the environmental, social, and economic impacts of decisions.
- 13 - Apply appropriate technical skills and academic knowledge.
- 14 - Communicate clearly, effectively, and with reason.
- 15 - Develop an education and career plan aligned to personal goals.

## PATHWAY STANDARDS

### B. Patient Care Pathway

- B2.0:** Understand the basic structure and function of the human body and relate normal function to common disorders.
- B3.0:** Know how to apply mathematical computations used in healthcare delivery system.
- B4.0:** Recognize and practice components of an intake assessment relevant to patient care.
- B5.0:** Know the definition, spelling, pronunciation, and use of appropriate terminology in the healthcare setting.
- B6.0:** Communicate procedures and goals to patients using various communication strategies to respond to questions and concerns.
- B7.0:** Apply observation techniques to detect changes in the health status of patients.
- B9.0:** Implement wellness strategies for the prevention of injury and disease.
- B10.0:** Comply with protocols and preventative health practices necessary to maintain a safe and healthy environment for patients, health care workers, coworkers, and self within the health care setting.
- B12.0:** Adhere to the roles and responsibilities, within the scope of practice, that contribute to the design and implementation of treatment planning.

### C. Healthcare Administrative Services

- C1.0:** Understand health care systems as the organization of people, institutions, funding, and resources as well as the broad scope of operations in which health care services are delivered to meet the health needs of target populations.
- C2.0:** Understand the various health care provider and support roles in patient care as an integrated, comprehensive health care system, to offer the very best options for treatment of patients.
- C 7.0:** Follow the model of medical safety practices and processes that can help prevent system medication errors and understand the consequences of mistakes.
- C 14.0:** Understand how to transfer information to third-parties.





## COMMON CORE STANDARDS

## ENGLISH LANGUAGE ARTS

## Language Standards

**LS 11-12.6:** Acquire and accurately use general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.

## Reading Standards for Literacy in Science and Technical Subjects

**RLST 11-12.4:** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11-12 texts and topics.

## Speaking and Listening Standards

**SLS 11-12.2:** Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions, and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.

**SLS 9-10. 11-12.1:** Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners, building on others ideas and expressing their own clearly and persuasively.

**SLS 11-12.1d:** Respond thoughtfully to diverse perspectives, synthesize comments, claims and evidence made on all sides of an issue, resolve contradictions when possible, and determine what additional information or research is required to deepen the investigation or complete the work.

## Writing Standards

**WS 11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.

**WS 11-12.7** Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

## Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects

**WHSST 11-12.4 11-12.4.** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

## MATHEMATICS

## Number and Quantity

**N-Q1:** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

**N-Q2:** Define appropriate quantities for the purpose of descriptive modeling.

**N-Q3:** Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

**ROP/CTE RECOMMENDED COURSE SEQUENCE**

<b>Introductory</b>	<b>Concentrator</b>	<b>Capstone</b>
Medical Core	Medical Assisting	Pharmacology for Health Professions

**COURSE RESOURCES**

<b>Textbooks</b>				
<b>Title</b>	<b>Author</b>	<b>Publisher</b>	<b>Edition</b>	<b>Primary (Y/N)</b>
Math for Healthcare Professionals	Mike Kennamer	Thompson		
Understanding Pharmacology for Health Professionals	Susan M. Turley	Prentice Hall		
Pharmacology for Technicians	Don Ballington	Paradigm Publishing		
<b>Other Resources</b>				
<b>Title</b>	<b>Author</b>	<b>Course Material Type</b>	<b>Website</b>	
California Board of Pharmacy			Pharmacy.ca.gov	
Food and Drug Administration			<a href="http://www.fda.gov/">http://www.fda.gov/</a>	
U.S. National Library of Medicine – Drug Information Portal			<a href="https://druginfo.nlm.nih.gov/drugportal/">https://druginfo.nlm.nih.gov/drugportal/</a>	