

Appendix: C. Sample Learning Objectives from Course Syllabi

Two sample learning objectives pulled from submitted course artifacts for both mathematics and reading occupational areas (CSS, HVAC, LPN, PT Introductory, PT Concluding, AMT).

Mathematics

Computer Support Specialist

Sample 1

1. Demonstrate a working knowledge of course terminology.
2. Demonstrate knowledge of the nature and purpose of accounting.
3. Define fundamental accounting terms.
4. Define users of accounting.
5. Understand the accounting equation.
6. Demonstrate knowledge of the cash basis, modified cash, and accrual basis
7. Understand and perform the steps involved in the accounting cycle for a service enterprise.
8. Journalize transactions.
9. Post to ledger accounts.
10. Prepare a trial balance.
11. Complete an end-of-period worksheet.
12. Prepare financial statements.
13. Complete a periodic summary.
14. Complete a practice set with or without the use of a computer.
15. Demonstrate knowledge of accounting for cash and cash items.
16. Maintain petty cash records.
17. Prepare bank reconciliation.

Sample 2

Upon successful completion of this course, the student should be able to:

1. Understand basic computer concepts
2. Access and work within the Windows XP environment;
3. Identify, manipulate and use the Windows XP desktop features;
4. Create, identify, move, copy, rename, organize and delete files and folders;
5. Use Help and Support features;
6. Use Search, Run, and Browse features;
7. Identify, locate and launch Microsoft Office 2007 applications;
8. Create and edit a word processing document;
9. Create a spreadsheet with formulas and embedded chart;
10. Create and query a database;
11. Create and use presentation software;
12. Access world wide web pages using Internet Explorer.

Heating, Cooling, and Air Conditioning

Sample 1

1. Demonstrate the ability to describe basic refrigeration and air conditioning.
 - a. Explain the history of air conditioning and refrigeration.
 - b. Explain the differences between air conditioning and refrigeration.
 - c. Explain the four major components of the vapor compression refrigeration system.
 - d. Determine career opportunities in the heating, air conditioning, and refrigeration industry.
 - e. Describe the role of the various trade associations.
2. Explain/describe the principles of thermodynamics and heat transfer.
 - a. Define matter and heat.
 - b. Explain the direction and rate of heat flow.
 - c. Describe the three methods of heat transfer. d. Identify the reference points of temperature.
 - d. Explain the relationship of pressures and fluids at saturation temperatures.
 - e. Explain compound gauges.
 - f. Compare micron to moisture and evacuation levels.
 - g. Describe the Temperature/Enthalpy (T -H) Diagram.
 - h. Convert cooling capacity from tons of refrigeration to kW and Btu/h to kW.
3. Demonstrate and describe the elements of EPA and OSHA safety regulations and first aid.
 - a. Discuss OSHA and EPA standards and regulations.
 - b. Identify, handle, use, and dispose of hardware material and gases.
 - c. Discuss and demonstrate the procedures specified on the Material Safety Data Sheet (MSDS).
 - d. Explain use of hazardous material transport manifest.
 - e. Discuss and demonstrate first responder procedures.
4. Describe and perform basic elements of refrigerant recovery and recycling.
 - a. Define terms associated with refrigerant recovery.
 - b. Describe the safety procedures needed.
 - c. Describe environmental issues regarding refrigerant, including legislation, protocol, laws, and regulations.
 - d. Perform refrigerant recovery and recycling.
5. Identify/explain the functions and types of lubricants and perform basic service activities.
 - a. Demonstrate handling of POE's.
 - b. Demonstrate how to draw an oil sample from the system.
 - c. Use an acid test kit for mineral oil and AB.

Sample 2

Upon completion of this course, the student will be able to:

1. Explain the principles of electricity.
2. Explain single- and three-phase power distribution.
3. Define and explain watts, ohms, volts, and amps.
4. Identify and explain electrical measuring tools and devices.
5. Explain the standards for the ways to measure watts, resistance, voltage, and amperage, using the appropriate instruments or devices.
6. Identify and explain appropriate electrical wiring symbols.

7. Draw and explain a wiring schematic diagram for a control system.
8. Create a schematic diagram for the each of the following:
 - a. An air conditioner, both a window unit and a split system
 - b. An electric furnace
 - c. A heat pump
 - d. An oil furnace
 - e. A gas furnace
9. Explain codes and standards and safety requirements for working with electrical components used in heating, air conditioning and refrigeration.
10. Troubleshoot protection devices, such as fuses and breakers.
11. Interpret tables and charts from the National Electrical Code (NEC).

Licensed Practical Nurse

Sample 1

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

1. Calculate drug dosages accurately.
2. Identify the fundamental principles related to pharmacology when administering medications.
3. Identify legal and ethical responsibilities of the practical nurse when administering medications.
4. Identify common therapeutic and diagnostic procedures with pharmacological implications.

Sample 2

The objectives of this course address the following Institutional Learning Outcomes:

ILO #1 – Think Critically

- Apply analytical and computational skills to solve mathematical problems.
- Synthesize critical thinking skills in deriving a mathematical model and finding solutions.

ILO #2 – Communicate Effectively

- Apply standard English in speaking and writing to clearly express ideas.
- Use language with clarity, coherence, and persuasiveness.

ILO #6 – Utilize Technology

- Demonstrate ability to utilize contemporary computer technology.

SPECIFIC LEARNING OUTCOMES:

At the end of this course, the student will be able to accomplish the following measurable objectives:

1. Perform operations with rational expressions/solve rational equations
2. Comprehend and utilize integral exponents
3. Assimilate absolute value equations and synthesize inequalities into graphical form
4. Comprehend basics of functions

5. Simplify fractional exponents and radicals
6. Factor polynomials
7. Solve quadratic and build polynomial equations
8. Solve systems of equations

Pharmacy Technician (Introductory)

Sample 1

Upon successful completion of this course students should be able to

1. Perform the basic operations with fractions, decimals, percents and ratio and proportions.
2. Perform the basic operations with signed numbers.
3. Simplify arithmetic operations using the Order of Operations.
4. Round numbers to a specific place.
5. Solve linear equations.
6. Perform basic operations with polynomials.
7. Interpret tables and graphs such as bar graphs, histograms, line graphs, pie charts, and pareto graphs.
8. Convert between scientific and decimal notation.
9. Compute and interpret the meaning of simple descriptive statistical measures.
10. Convert between Metric, Apothecary and English measurement systems.
11. Solve applications problems that are relevant to selected health professions.
12. Convert between Fahrenheit, Celsius and Kelvin temperature scales.

Sample 2

By the end of the course, students will demonstrate competency in:

1. Understanding and using the language of algebra
2. Performing computations with real numbers using order of operations
3. Translating verbal statements into algebraic expressions and equations
4. Solving first-degree equations
5. Using ratios and proportions to solve problems
6. Organizing and analyzing information using tables and/or other visual representations
7. Creating and interpreting graphs
8. Using tables, equations, and graphs to solve applied problems
9. Using and manipulating formulas
10. Communicating the results and conclusions of applied problem solving

Pharmacy Technician (Concluding)

Sample 1

Objectives: Upon successful completion of the course, students should be able to:

1. Use mathematical calculations and formulas to measure drug doses.

2. Calculate medication dosing utilizing various analysis methods.
3. Identify common medical errors.
4. Explain possible implications of errors and describe preventative measures.

Sample 2

Course Objectives: Upon completion of Pharmaceutical Calculations, students will be able to:

1. Add and subtract, multiply and divide real numbers, including whole numbers, fractions, and decimals.
2. Convert between percents, decimals, and fractions.
3. Describe alternative units of measurements (metric, apothecary, household, avoirdupois) and convert between them.
4. Convert between Fahrenheit and Celsius temperatures.
5. Convert between European and traditional American time.
6. Interpret and process a drug order.
7. Calculate amounts of drugs to administer.
8. Accurately use medicine cups, calibrated droppers, calibrated spoons, and oral syringes for measure.
9. Calculate injectionable drug dosages.
10. Calculate IV components and flow rates.
11. Calculate pediatric dosages of drugs
12. Discuss special issues involved with geriatric drug administration.
13. Calculate cost differentials of alternative treatment plans.

Automotive Master Technician

Sample 1

Course Student Learning Outcomes: (Cognitive, Psychomotor, Affective Domains)

1. Upon completion of this course the students have demonstrated they have an understanding of safe working habits by completing a written and practical safety evaluation.
2. Upon completion of this course the students can identify and demonstrate the correct use of hand and power tools relating to performing brake service.
3. Upon completion of this course the students have demonstrated they can inspect a brake system and determine needed repairs through written and practical evaluations.
4. Upon completion of this course the students have demonstrated through practical evaluations they can remove and replace disc and drum brake components according to manufacturers' specifications.
5. Upon completion of this course the students have demonstrated an understanding of hydraulic principles as they apply to automotive brake systems by successfully completing written and practical evaluations.
6. Upon completion of this course the students have demonstrated an understanding of anti-lock braking systems by successfully completing written and practical evaluations.

Sample 2

Course Outcomes

Upon course completion the successful student will know and be able to:

1. Identify common electrical components by name, symbol and physical description.
2. State the relationship between voltage, amperage and resistance (ohms).
3. Demonstrate the correct usage of both digital and analog meters.
4. State the difference between the current flow and electron flow theories.
5. Identify series, parallel and series-parallel circuits.
6. State the operating principles and ratings of different types of batteries.
7. Explain the basic principles of both direct (DC) and alternating (AC) current.
8. State the operating characteristics of diodes and transistors (both NPN and PNP).
9. Have had the opportunity to design, operate, and troubleshoot electrical circuits.
10. Demonstrate the ability to work safely and as a productive member of a team.

Reading

Computer Support Specialist

Sample 1

General Course Objectives

The student will be able to:

1. Create Visual Basic .net programs using proper syntax and procedures
2. Document Visual .net programs.
3. Analyze and correct programming errors and problems.
4. Demonstrate proper use of debug.
5. Use and validate interactive user input
6. Understand and use selection and repetition structures
7. Understand and use sub procedures and functions
8. Process various Visual Basic .net data files
9. Understand and use structured data.
10. Create programs to access databases.

Sample 2

Students will be able to use the operating system (Windows 7), a word processing software (Microsoft Word), a spreadsheet software (Excel), and a presentation software (PowerPoint).

1. To be able to identify the computer hardware and software
2. To be able to create, edit and format a document.
3. To be able to create, edit and format a spreadsheet to include inputting formulas.
4. To be able to create, edit and format a slide show using transitions.

Heating, Ventilation and Air Conditioning

Sample 1

1. Define/identify various terms of basic electricity.
 - a. Define watts, ohms, volts, and amps.
 - b. Define and compare single- and three-phase voltage and current.
 - c. Identify types of electrical loads.
 - d. Identify principles of solid-state switching devices.
2. Explain, construct, and analyze various circuits.
 - a. Define terms associated with circuits.
 - b. Explain the procedures for constructing circuits.
 - c. Construct and analyze each of the three circuits.
3. Explain the principles of electrical generation and distribution.
 - a. Explain the basic generator principle.
 - b. Explain how electricity is produced and distributed.
4. Define and explain the safe use/function of electrical devices.

- a. Define magnetic theory.
 - b. Define and explain the use of capacitors.
 - c. Define and explain the use of starters/heaters.
 - d. Define and explain the use of relays/switches.
 - e. Define and explain the use of delays/thermostats.
 - f. Define and explain the use of electrically operated valves.
5. Explain and demonstrate procedures for testing electrical motors.
- a. Explain the operation and application of electric motors.
 - b. Explain the electric motor theory.
 - c. Demonstrate use of testing equipment.

Sample 2

After successful completion of this course,

1. The student will be able to choose and use the correct scale to measure or locate an item on a set of Architecture plans as evidenced by:
 - a. Given any type of plan the student will be able to locate the scale of the plan and then select the right type of scale to use for that plan, at a success rate of seventy percent.
 - b. b) Knowing the correct scale of a drawing the student will be able to use the scale to measure and give the actual size of it, at a success rate of seventy percent.
2. The student will be knowledgeable enough with Architecture construction plans to identify the different component plans within a complete set of Architecture Plans, as evidenced by:
 - a. Given a Cover sheet from a set of Architecture Plans the student will be able to give the following information; the number of sheets in the set, the company that did the project, the name of the project, the location of the project, the date the project was designed, and the person responsible for the project, at a success rate of seventy percent.
 - b. Given a complete set of Architecture Plans the student will be able to find and point out a specific plan as requested by the instructor, at a success rate of eighty percent.
3. The student will be able to locate any specific section or detail within a complete Architecture set of drawings, as evidenced by:
 - a. Given a Floor Plan from a complete set of Architecture Plans, the student will be able to locate where a section or detail is called out and then find the reference section or detail in the set of drawings, at a success rate of eighty percent.
4. The student will be able to do a complete or partial quantity take-off from any given set of Architectural plans, as evidenced by:
 - a. Given a quantity take-off form and a set of Architecture plans, the student will be able to complete the quantity take-off form at a success rate of seventy percent.
 - b. Given a specific material, the student will be able to calculate the quantity needed from a set of Architectural plans at a success rate of seventy percent.

Licensed Practical Nursing

Sample 1

- A. Provide safe, competent, holistic care to a diverse group of clients within the scope of practical nursing.
- B. Provide health promotion, maintenance, and restoration.
- C. Demonstrate critical thinking skills.

Competencies

1. Collect data pertinent to client's psychological state
2. Collect data pertinent to client's physiological state
3. Apply safety principles to nursing care
4. Apply asepsis and infection control principles
5. Examine principles and nursing care of oncology clients
6. Demonstrate nursing skills related to preoperative and postoperative care
7. Describe pre/post operative client nursing care
8. Provide nursing care related to health promotion, maintenance, and restoration related to the integumentary system
9. Describe principles of drug administration
10. Demonstrate safe and accurate medication administration
11. Promote client comfort
12. Relate nutrition for disease prevention/maintenance and health promotion
13. Relate nutritional concepts and the use of therapeutic diets in nursing care
14. Interpret fluid/electrolyte balance concepts across the lifespan
15. Demonstrate nursing skills related to the management of IV therapy

Sample 2

Upon completion of the course the student will:

1. Perform basic nursing skills in providing comfort and safety needs of the client.
2. Implement nursing measures applying knowledge essential to the care of the adult client.
3. Identify the student practical nurses role as a member of the health care team.
4. Demonstrate a beginning knowledge of the nursing process in planning and implementing basic nursing care.
5. Demonstrate a beginning knowledge of critical thinking utilizing practice exercises
6. Demonstrate responsibility by consistently performing safe practice.
7. Utilize correct body mechanics when providing nursing care.
8. Determine basic vital assessments.
9. Identify client learning needs.
10. Communicate client information utilizing verbal and written skills.
11. Demonstrate a beginning compliance with legal/ethical responsibilities of the practical nurse while caring for the client.

Pharmacy Technician (Introductory)

Sample 1

1. Recognize and determine classifications of pharmaceuticals for therapeutics of the nervous system and psychopharmacology, musculoskeletal system and respiratory system.
2. Utilize critical thinking skills to read and assess medical literature
 - a. Review and critique medical literature regarding disease and drug therapeutics in order to gain a better understanding of the body systems covered in class for future reference
3. Identify and name routes of drug administration for body systems.
4. Determine variables involved in contraindications and interactions of drug administration for specific systems.
5. Identify basic human diseases and conditions in body systems.

Sample 2

At the end of this course, students will be able to do the following:

1. Demonstrate a personal study system that includes strategies for comprehension, retention, and recall; these strategies include previewing, annotating, learning academic vocabulary, note taking and organizing key information.
2. Summarize the thesis, main ideas, and major supporting details of articles and textbook chapters
3. Apply critical reading skills to analyze and evaluate the components of an author's argument.
4. Identify a controversial issue and find information from a variety of sources to research the issue.
5. Evaluate the credibility of sources of information.
6. Students will apply techniques of critical reflection to broaden and support their perspectives and integrate new knowledge.

Pharmacy Technician (Concluding)

Sample 1

1. Discuss gastrointestinal (GI. physiology and how it impacts GI diseases.
2. Explain Gastro-esophageal-reflux disease (GERD..
3. Understand the calculation of ideal body weight (IBW..
4. Describe the basic structure and function of the renal system.
5. Explain the importance of immunization agents.*
6. Differentiate between anti-viral and anti-fungal therapy.
7. List differences in mechanism of action (MOA. of antibiotics and anti-viral drugs.
8. Identify muscles relaxants and non-narcotic analgesics and their mechanism of action (MOA)

9. Differentiate between rheumatoid arthritis (RA.), osteoarthritis (OA.), and gout and discuss their treatment.
10. Explain the concept of hormonal therapy.
11. Discuss thyroid replacement therapy and the adrenal hormones.
12. Identify common endings for drug classes used in the treatment of hypothyroidism and hyperthyroidism.
13. Discuss the use of topical agents (creams, ointments, etc).
14. Recognize ophthalmic and otic agents and their indications.
15. Understand the immune system and how it works.
16. Differentiate between bacteriostatic and bactericidal.
17. Identify risk factors for specific cancers.
18. Describe mechanisms of action for each class of drugs used to treat decubitus ulcers.
19. Describe the etiology of eczema and psoriasis.
20. Explain the epidemiology of lice and scabies infestation.
21. Explain the importance of warning labels and precautionary messages associated with medications used to treat diabetes mellitus.*
22. Describe the risk factors for diabetes mellitus.
23. Explain mechanism of action for drugs used for the treatment of fluid and electrolyte disorders.
24. List and categorize medications used for the treatment of prostate disease.
25. Prepare monographs for various drugs listing dosage, usage, and therapeutic effects.

* Meets general education critical thinking objectives.

Sample 2

1. Discuss facets of pharmacy operations management, including recordkeeping and inventory control.
2. Demonstrate standard practices in record-keeping and documentation, including prescription filling, information storage, and DEA and procurement standards.
3. Utilize various office applications commonly found in medical settings, such as word processing, spreadsheet, and database software; and demonstrate a basic understanding of computer hardware
4. Use general office machines appropriately, such as telephone, fax, copier, computers, scanners, etc.
5. Locate and use online databases and automated systems to research medication information, and discuss emerging technologies that may impact the practice of pharmacy
6. Identify types of health insurance, the types of coverage that they provide, and the claim forms and practices used by each.
7. Utilize pharmacy software by entering prescriptions in a virtual pharmacy system
8. Perform dosage calculations and prescription processing including basic math skills all the way up to advanced math skills
9. Develop keyboarding skills essential to pharmacy practice
10. Obtain CPR certification
11. Practice essential skills needed for compounding purposes for both sterile and non-sterile preparations

12. Review certification requirements from the PTCB, and utilize practice and mock exams to prepare for the PTCE
13. Practice PTCB exam questions utilizing online software

Automotive Master Technician

Sample 1

The student shall be able to:

1. Demonstrate knowledge of principles of electricity and magnetic induction theory.
2. Demonstrate proficiency in the use of multimeters and other diagnostic equipment reflecting current industry standards.
3. Diagnose, troubleshoot, and evaluate batteries, starting systems, and charging systems.
4. Obtain and use service and diagnostic information from typical service literature sources including factory service manuals, general manuals, electronic data retrieval systems, and the internet.

General Education Student Learning Outcomes:

A written paper assignment will be required in this class. Some assignments require the use of certain basic math skills. Critical thinking skills will also be evaluated.

Sample 2

This course will study engine components, terminology of engine design, and will provide a basic understanding of engine design and operation.

1. Interpret and verify complaint; determine needed repairs.
2. Inspect engine assembly for fuel, oil, coolant, and other leaks; determine needed repairs.
3. Listen to engine noises; determine needed repairs.
4. Diagnose the cause of excessive oil consumption, unusual engine exhaust color, odor, and sound; determine needed repairs.
5. Inspect valve guides for wear
6. Inspect valves
7. Inspect valve seats
8. Check valve face-to-seat contact and valve seat concentricity (runout)
9. Inspect pushrods, rocker arms, rocker arm pivots and shafts for wear, bending, cracks, looseness, and blocked oil passages
10. Inspect hydraulic or mechanical lifters
11. Inspect camshaft drives (including gear wear and backlash, sprocket and chain wear, overhead cam drive sprockets, drive belts, belt tension, and tensioners).
12. Inspect and measure camshaft journals and lobes.
13. Inspect and measure camshaft bearings for damage, out-of-round, and alignment; determine needed repairs.
14. Inspect engine block for cracks, passage condition, core and gallery plug condition, and surface warpage; determine needed repairs.

15. Inspect internal and external threads
16. Inspect cylinder walls for damage and wear
17. Inspect camshaft bearings for wear damage, out-of-round, and alignment
18. Inspect crankshaft for surface cracks and journal damage; check oil passage condition; determine needed repairs.
19. Identify piston and bearing wear patterns that indicate connecting rod alignment and main bearing bore problems
20. Identify oil pressure tests; determine needed repairs.
21. Inspect oil pump gears or rotors, housing, pressure relief devices, and pump drive