**Course Description:**

Students use advanced architectural design concepts to construct design models including perspective drawings for final presentations. Students use orthographic/pictorial projection, freehand technical sketching and computer-aided drafting (CAD) tools to create site foundation and section plans that include topographical details and schedules. Additionally, students perform zoning analysis, develop preliminary plot plans, and construct grading and utilities plans that include legal descriptions and cut and fill volumes.

**Strand 1. Business Operations/21st Century Skills**

Learners apply principles of economics, business management, marketing and employability in an entrepreneur, manager and employee role to the leadership, planning, developing and analyzing of business enterprises related to the career field.

**Outcome 1.1. Employability Skills**

Develop career awareness and employability skills (e.g., face‐to‐face, online) needed for gaining and maintaining employment in diverse business settings.

**Competencies**

1.1.1. Identify the knowledge, skills and abilities necessary to succeed in careers.

1.1.2. Identify the scope of career opportunities and the requirements for education, training,

certification, licensure and experience.

1.1.3. Develop a career plan that reflects career interests, pathways and secondary and

postsecondary options.

1.1.4. Describe the role and function of professional organizations, industry associations and

organized labor and use networking techniques to develop and maintain professional

relationships.

1.1.5. Develop strategies for self‐promotion in the hiring process (e.g., filling out job applications,

résumé writing, interviewing skills, portfolio development).

1.1.6. Explain the importance of work ethic, accountability and responsibility and demonstrate

associated behaviors in fulfilling personal, community and workplace roles.

1.1.7. Apply problem‐solving and critical‐thinking skills to work‐related issues when making decisions

and formulating solutions.

1.1.8. Identify the correlation between emotions, behavior and appearance and manage those to

establish and maintain professionalism.

1.1.9. Give and receive constructive feedback to improve work habits.

1.1.10. Adapt personal coping skills to adjust to taxing workplace demands.

1.1.11. Recognize different cultural beliefs and practices in the workplace and demonstrate respect

for them.

1.1.12. Identify healthy lifestyles that reduce the risk of chronic disease, unsafe habits and abusive

behavior.

**Outcome 1.2. Leadership and Communications**

Process, maintain, evaluate and disseminate information in a business. Develop leadership and team building to promote collaboration.

**Competencies**

1.2.1. Extract relevant, valid information from materials and cite sources of information.

1.2.2. Deliver formal and informal presentations.

1.2.3. Identify and use verbal, nonverbal and active listening skills to communicate effectively.

1.2.4. Use negotiation and conflict‐resolution skills to reach solutions.

1.2.5. Communicate information (e.g., directions, ideas, vision, workplace expectations) for an

intended audience and purpose.

1.2.6. Use proper grammar and expression in all aspects of communication.

1.2.7. Use problem‐solving and consensus‐building techniques to draw conclusions and determine

next steps.

1.2.8. Identify the strengths, weaknesses and characteristics of leadership styles that influence

internal and external workplace relationships.

1.2.9. Identify advantages and disadvantages involving digital and/or electronic communications

(e.g., common content for large audience, control of tone, speed, cost, lack of non‐verbal

cues, potential for forwarding information, longevity).

1.2.10. Use interpersonal skills to provide group leadership, promote collaboration and work in a

team.

1.2.11. Write professional correspondence, documents, job applications and résumés.

1.2.12. Use technical writing skills to complete forms and create reports.

1.2.13. Identify stakeholders and solicit their opinions.

1.2.14. Use motivational strategies to accomplish goals.

**Outcome 1.3. Business Ethics and Law**

Analyze how professional, ethical and legal behavior contributes to continuous improvement in organizational performance and regulatory compliance.

**Competencies**

1.3.1. Analyze how regulatory compliance affects business operations and organizational

performance.

1.3.2. Follow protocols and practices necessary to maintain a clean, safe and healthy work

environment.

1.3.3. Use ethical character traits consistent with workplace standards (e.g., honesty, personal

integrity, compassion, justice).

1.3.4. Identify how federal and state consumer protection laws affect products and services.

1.3.5. Access and implement safety compliance measures (e.g., quality assurance information, safety

data sheets [SDSs], product safety data sheets [PSDSs], United States Environmental

Protection Agency [EPA], United States Occupational Safety and Health Administration

[OSHA]) that contribute to the continuous improvement of the organization.

1.3.6. Identify deceptive practices (e.g., bait and switch, identity theft, unlawful door‐to‐door sales,

deceptive service estimates, fraudulent misrepresentations) and their overall impact on

organizational performance.

1.3.7. Identify the labor laws that affect employment and the consequences of noncompliance for

both employee and employer (e.g., harassment, labor, employment, employment interview,

testing, minor labor laws, Americans with Disabilities Act, Fair Labor Standards Acts, Equal

Employment Opportunity Commission [EEOC]).

1.3.8. Verify compliance with computer and intellectual property laws and regulations.

1.3.9. Identify potential conflicts of interest (e.g., personal gain, project bidding) between personal,

organizational and professional ethical standards.

**Outcome 1.4. Knowledge Management and Information Technology**

Demonstrate current and emerging strategies and technologies used to collect, analyze, record and share information in business operations.

**Competencies**

1.4.1. Use office equipment to communicate (e.g., phone, radio equipment, fax machine, scanner,

public address systems).

1.4.2. Select and use software applications to locate, record, analyze and present information (e.g.,

word processing, e‐mail, spreadsheet, databases, presentation, Internet search engines).

1.4.3. Verify compliance with security rules, regulations and codes (e.g., property, privacy, access,

accuracy issues, client and patient record confidentiality) pertaining to technology specific to

the industry pathway.

1.4.4. Use system hardware to support software applications.

1.4.5. Use information technology tools to maintain, secure and monitor business records.

1.4.6. Use an electronic database to access and create business and technical information.

1.4.7. Use personal information management and productivity applications to optimize assigned

tasks (e.g., lists, calendars, address books).

1.4.8. Use electronic media to communicate and follow network etiquette guidelines.

**Outcome 1.5. Global Environment**

Evaluate how beliefs, values, attitudes and behaviors influence organizational strategies and goals.

**Competencies**

1.5.1. Describe how cultural understanding, cultural intelligence skills and continual awareness are

interdependent.

1.5.2. Describe how cultural intelligence skills influence the overall success and survival of an

organization.

1.5.3. Use cultural intelligence to interact with individuals from diverse cultural settings.

1.5.4. Recognize barriers in cross‐cultural relationships and implement behavioral adjustments.

1.5.5. Recognize the ways in which bias and discrimination may influence productivity and

profitability.

1.5.6. Analyze work tasks for understanding and interpretation from a different cultural perspective.

1.5.7. Use intercultural communication skills to exchange ideas and create meaning.

1.5.8. Identify how multicultural teaming and globalization can foster development of new and

improved products and services and recognition of new opportunities.

**Outcome 1.12. Cyber Hygiene**

Apply digital information security principles to keep information secure.

**Competencies**

1.12.1. Identify the purpose and practices of Cyber Hygiene.

1.12.2. Differentiate between appropriate and inappropriate information.

1.12.3. Interpret security policies through job specific training and training updates.

1.12.4. Apply secure password behavior.

1.12.5. Apply physical and virtual situational awareness (e.g., clean desk policies, shoulder surfing, social engineering, tailgating).

**Strand 2. Safety, Tools, and Equipment**

Learners apply principles of protection, prevention and mitigation to create and maintain safe working conditions at construction sites. Knowledge and skills may be applied in all aspects of personal site safety to meet all applicable standards.

**Outcome 2.1. Site Safety**

Handle materials, prevent accidents and mitigate hazards.

**Competencies**

2.1.1. Use Occupational Safety and Health Administration (OSHA)‐defined procedures for identifying

employer and employee responsibilities, working in confined spaces, managing worker safety

programs, using ground fault circuit interrupters (GFCIs), maintaining clearance and

boundaries and labeling.

2.1.2. Identify and rectify or mitigate construction hazards (e.g., thresholds, slippery surfaces, lighting and workplace clutter).

**Outcome 2.2. Personal Safety**

Practice personal safety in construction.

**Competencies**

2.2.3. Select, use, store, maintain and dispose of personal protective equipment (PPE) appropriate

to job tasks, conditions and materials.

2.2.4. Identify workplace risk factors associated with lifting, operating and moving heavy objects

and establish an ergonomics process.

2.2.5. Identify, inspect and use safety equipment appropriate for the task.

2.2.10 Describe the process for identifying and locating existing site utilities.

**Strand 3. Structural Construction**

Learners apply principles of architectural engineering to erect residential, commercial and industrial buildings. Knowledge and skills may be applied in constructing footings and foundations; framing floors, walls, ceilings, roofs and stairs; completing exterior and interior finishes; and repairing, restoring or remodeling existing structures.

**Outcome 3.2. Site Management**

Analyze site management operations.

**Competencies**

3.2.1. Identify topographical and existing features of areas (i.e., property lines, utilities, streets,

setbacks) on survey maps (parcel map, survey plat).

3.2.2. Interpret features of a site plan.

3.2.3. Apply conventional engineering and field measurement processes to survey for site

development.

3.2.4. Identify and apply relevant building codes.

**Strand 6. Construction Management and Jobsite Maintenance**

Learners apply principles of business, facility and site operations and project management to build and operate residential, commercial and industrial facilities. Knowledge and skill may be applied in managing and supervising site operations; developing work sequences for tasks and units of work; coordinating material and equipment delivery; planning building stages and the build environment; and providing facility management, and maintenance services.

**Outcome 6.1. Construction Math**

Apply math and measurement principles to complete construction projects.

**Competencies**

6.1.1. Calculate surface area and volume for three‐dimensional objects, accurate to a specified level of precision.

6.1.2. Apply measurement scales to layout length, width, and angle measurements.

6.1.3. Apply algebraic procedures and geometric concepts to reading construction documents.

6.1.4. Use proportional reasoning and apply indirect measurement techniques (e.g., right triangle

trigonometry, properties of similar triangles).

6.1.5 Select and use measurement tools (i.e. grade rod, ruler, tape measure, measuring cups, builder's level).

6.1.6 Perform calculations and conversions with fractions, decimals, and percents.

6.1.7 Perform unit conversions.

**Outcome 6.2. Construction Drawings**

Read and interpret plans and diagrams within a construction drawing set (i.e., topographical, grading and drainage, architectural, structural, plumbing, mechanical, electrical) to organize a project work sequence.

**Competencies**

6.2.1. Collect and analyze project information to determine resources and tasks required to

complete a project.

6.2.2. Read and interpret a site plan.

6.2.3. Use architect’s and engineer’s scales to read and interpret construction drawings for material

calculations and installation at the jobsite.

6.2.4. Read, interpret, and organize construction drawings, models, specifications and other contractual documents.

6.2.5. Describe various building sections, wall sections and other architectural details of residential, commercial, utility, and highway construction.

6.2.6. Identify and interpret aspects of sustainable design and construction techniques in construction drawings and specifications.

6.2.7. Identify and interpret aspects of the Americans with Disabilities Act (ADA) in construction drawings and specifications.

6.2.8. Read and interpret various 3-D and other Computer Aided Design (CAD) generated views in construction drawings.

6.2.9. Read and interpret various Building Information Modeling (BIM) generated views in construction drawings.

**Outcome 6.5. Field Organization**

Summarize the sequence of building stages, systems quality control, and inspection processes within a build environment.

**Competencies**

6.5.1. Identify the Critical Path Method (CPM) to select and sequence the appropriate building stages and explain their relationships in completing a construction project.

6.5.7. Identify the roles and goals of construction professionals within a given delivery system (e.g., owners, architects, engineers, suppliers, general and trade contractors, consultants, regulators).

**Strand 7. Planning and Design**

Learners apply principles of architectural and civil engineering, drawing and construction with current technology to develop, present and use construction proposals, plans and schematics. Knowledge and skill may be applied throughout the project from preconstruction design through all stages of building in residential, commercial and industrial applications.

**Outcome 7.1. Proposals**

Develop and present a design, proposal, or concept.

**Competencies**

7.1.1. Differentiate between residential, commercial, industrial, infrastructure, and institutional construction segments.

7.1.2. Collect and analyze data to identify required deliverables (e.g., reports, studies, building

designs, drawings) based on client specifications.

7.1.3. Conceptualize design through hand drawing.

7.1.4. Create a visualization of a proposed project using data from relevant materials according to

client specifications and in compliance with building codes.

7.1.5. Incorporate building structural systems, environmental systems, safety systems, building

envelope systems and building service systems into the design.

7.1.6. Incorporate sustainable design and construction techniques.

7.1.7. Incorporate the Americans with Disabilities Act (ADA) Standards for Accessible Design.

7.1.8. Develop and present the comprehensive proposal.

**Outcome 7.2. Community Planning**

Compare and contrast construction planning in urban and rural areas.

**Competencies**

7.2.1. Identify components necessary to managing municipal functions.

7.2.2. Describe the roles of city governments in community planning.

7.2.3. Examine problems of mass movement and spatial reorganization generated by expanding populations.

7.2.4. Identify implementation tools for orderly, efficient and equitable development and arrangement of land (i.e., zoning, development regulations, capital improvement programs).

7.2.5. Discuss appropriate health and social programs to improve the standard of living for those lacking in resources and/or opportunities.

7.2.6. Examine the preservation of historic buildings, neighborhoods and sites to implement a cultural appreciation of architecture and geographic heritage through the protection of the physical representations of that heritage.

7.2.7. Compare the community goals and objectives to the coordination of the transportation network.

7.2.8. Analyze housing problems and opportunities.

7.2.9. Identify economic development resources (e.g., policy development) for attracting and retaining industries.

7.2.10. Integrate environmental values (e.g., preservation of wetlands, air quality strategies, protection of natural areas) into land use and other community plans.

7.2.11. Merge the harmonious design (e.g., culture, related buildings and areas, aesthetics) of urban areas with urban policy.

7.2.12. Examine the strategies for regional and national development (i.e., modernization and urbanization, transportation, rural development patterns, sustainable development, related strategies of economic development).

7.2.13. Examine the economic factors that determine whether and where development, restoration and other investments occur.

**Outcome 7.3. Drafting**

Design residential, industrial, civil and commercial plans in accordance with the current American Institute of Architects (AIA) Architectural Graphic Standards.

**Competencies**

7.3.1. Construct site plans in accordance with the current American Institute of Architects (AIA) Architectural Graphic Standards, (e.g., zoning, property lines, utilities, building line, setback).

7.3.3. Construct foundation and roof plans in accordance with the current American Institute of Architects (AIA) Architectural Graphic Standards.

7.3.5. Incorporate public spaces and cultural aesthetics in commercial structures.

7.3.6. Identify the role of Computer Aided Design (CAD) and Building Information Modeling (BIM) in Construction drafting.

7.3.7. Identify the parties involved and the roles each play in the Building Information Modeling (BIM) process from conceptual design through construction completion and into facility management.

7.3.8. Describe the Building Information Modeling (BIM) process from conceptual design through construction completion and into facility management.