Learning Objectives Structure: December 15, 2010

Note: This list is reflective of the proposed curriculum as developed for the October, 2010 submittal (labeled: **As Is)**, and edits by the sub-committee (labeled: **Edited**)

The learning objectives have been organized to reflect a general structure as follows:

1-2: Global Statement (Knowledge)
3-4: Gen Ed (Knowledge & Skills)
5-6: Skill Sets (Skills)

Not all learning objectives fit neatly into the above categories, so there is some flexibility in the categories.

Design I: As Is

1. Implement an iterative design process from problem identification, information gathering, solution generation and evaluation, implementation, presentation, and overall project evaluation.
2. Incorporate design concepts and vocabulary into their design process and presentations.
3. Demonstrate the ability to produce orthographic, axonometric, perspective, and architectural vignette drawings.
4. Adequately utilize hand and digital media to create drawings and models.
5. Determine the appropriate method and media required to complete a drawing or model.
6. Communicate ideas and information both verbally and through writing.

Design I: Edited

1. **Implement** an iterative design process from problem identification, information gathering, solution generation and evaluation, implementation, presentation, & overall project evaluation. (Knowledge)
2. **Incorporate** design concepts & vocabulary into design process & presentations. (Knowledge)
3. **Distinguish** between media & **Determine** the appropriate method & media required to complete a drawing or model. (Gen Ed)
4. **Communicate** ideas & information both **verbally** & through **writing**. (Gen Ed)
5. **Develop** & **apply** professional vocabulary. (Gen Ed)
6. **Produce** orthographic, axonometric, perspective, & architectural vignette drawings. (Skill)
7. **Utilize** analogue & digital media to create drawings & models. (Skill)

Design II: As Is:

1. Implement an iterative design process from problem identification, information gathering, solution generation and evaluation, implementation, presentation, and overall project evaluation.
2. Incorporate design concepts and vocabulary into their design process and presentations.
3. Demonstrate the ability to produce orthographic, axonometric, perspective, and architectural vignette drawings.
4. Adequately utilize hand and digital media to create drawings and models.
5. Determine the appropriate method and media required to complete a drawing or model.
6. Incorporate color and materials into designs and presentations.
7. Communicate ideas and information both verbally and through writing.

Design II: Edited

1. **Implement** an iterative design process from problem identification, information gathering, solution generation and evaluation, implementation, presentation, & overall project evaluation. (Knowledge)
2. **Incorporate** design concepts & vocabulary into design process & presentations. (Knowledge)
3. **Distinguish** between media & **Determine** the appropriate method & media required to complete a drawing or model. (Gen Ed)
4. **Communicate** ideas & information both **verbally** & through **writing**. (Gen Ed)
5. **Develop** & **apply** professional vocabulary. (Gen Ed)
6. **Produce** orthographic, axonometric, perspective, & architectural vignette drawings. (Skill)
7. **Utilize** analogue & digital media to create drawings & models. (Skill)
8. **Incorporate** color & materials into designs & presentations. (Skill)
9. **Represent** human scale and proportion in design drawings. (Skill)

Design III: As Is

1. Manipulate solid & void & positive & negative spaces in 2D & 3D. (Skill)
2. Demonstrate an understanding of how architecture is perceived by moving through spaces. (Knowledge)
3. Demonstrate an ability to create a design base on an abstract concept. (Knowledge)
4. Organize space into plans, elevations, sections & models. (Knowledge)
5. Work with an architectural program. (Knowledge)
6. Understand the concepts of vertical & horizontal circulation. (Knowledge)
7. Conduct initial research, including building type, functional requirements, design precedents, historic & physical context, materials, & technologies. (Gen Ed)

Design III: Edited

1. **Understand** the impact horizontal & vertical circulations have on the perception of architectural space & **apply** it to design. (Knowledge)
2. **Demonstrate** an ability to create a design base on an abstract concept. (Knowledge)
3. **Understand** the difference between solid & void & positive & negative spaces & **apply** it in 2D & 3D designs. (Knowledge)
4. **Distinguish** between media & **Determine** the appropriate method & media required to complete a drawing or model. (Gen Ed)
5. **Communicate** ideas & information both **verbally** & through **writing**. (Gen Ed)
6. **Research** & **practice information literacy** Skills by researching precedents. (Gen Ed)
7. **Apply quantitative analysis** to design. (Gen Ed)
8. **Produce** orthographic, axonometric, perspective, & architectural vignette drawings. (Skill)
9. **Utilize** analogue & digital media to create drawings & models. (Skill)
10. **Apply** knowledge of site circulation, zoning, urban context, and views to design. (Skill)
11. **Represent** human scale and proportion in design drawings. (Skill)
12. **Apply** knowledge of construction types, circulation systems, hierarchy, and light to building design. (Skill)
13. **Develop** parti concepts and diagrams into schematic level drawings. (Skill)

Design IV: As Is

1. Understand the hierarchy of architectural problems with various volumetric spaces. (Knowledge)
2. Conduct initial research, including building types, functional requirements, design precedents, historic & physical context, materials & technologies. (Gen Ed)
3. Apply basic concepts of site analysis: topography, views, weather, sun, water, site circulation, zoning, and urban context. (Skill)
4. Understand how to design a building that responds to: flow diagrams, space planning, and analysis of the important design elements, massing studies. (Knowledge)
5. Understand & apply basic architectural concepts of parti, human scale, spatial experience, structure, materials, & building envelope design. (Knowledge)
6. Develop architectural ideas from preliminary through final design & make an effective presentation, including drawings & models. (Gen Ed)

Design IV: Edited

1. **Understand** the differences between building systems & **apply** them to design. (Knowledge)
2. **Understand** how to diagram the important characteristics of a building & **apply** it to the design. (Knowledge)
3. **Distinguish** between media & **Determine** the appropriate method & media required to complete a drawing or model. (Gen Ed)
4. **Communicate** ideas & information both **verbally** & through **writing**. (Gen Ed)
5. **Research** & **practice information literacy** Skills by researching precedents. (Gen Ed)
6. **Apply quantitative analysis** to design. (Gen Ed)
7. **Collaborate** on group projects. (Gen Ed)
8. **Produce** orthographic, axonometric, perspective, & architectural vignette drawings. (Skill)
9. **Utilize** analogue & digital media to create drawings & models. (Skill)
10. **Apply** knowledge of site circulation, zoning, urban context, and views to design. (Skill)
11. **Represent** human scale and proportion in design drawings. (Skill)
12. **Apply** knowledge of construction types, circulation systems, hierarchy, and light to building design. (Skill)
13. **Apply** sustainable principles to development design and construction documents. (Skill)
14. **Develop** parti concepts and diagrams into design document level drawings. (Skill)

Visual Studies I: As Is

1. Demonstrate applied knowledge of computer hardware, good practices in file management, PDF creation, spreadsheet creation, word processing, and output to printers and plotters.
2. Apply techniques of image capture, composition, manipulation, post-processing, and output.
3. Proficiently create digital 3D models of medium geometric complexity.
4. Demonstrate basic proficiency in digital and analog rendering, showing shade and shadow.
5. Demonstrate knowledge of architectural graphic conventions and a proficiency in graphic presentation Skills including page composition, drafting, drawing, illustration and diagramming.
6. Implement design concepts and vocabulary such as proportion, hierarchy, balance, and composition.
7. Communicate ideas and information both verbally and through writing.

Visual Studies I: Edited

1. **Recognize** the complexity of the physical world (Knowledge)
2. **Demonstrate** understanding of computer hardware and software as used in architectural practice (Knowledge)
3. **Demonstrate** knowledge of graphic conventions and methods of organization (Knowledge and Skill)
4. **Communicate** ideas and information both verbally and through writing (Gen Ed)
5. **Recognize** design concepts and vocabulary (Gen Ed)
6. **Document** analogue materials into digital format & process & edit for presentations and portfolio. (Skill)
7. **Create** digital three-dimensional models of medium geometric complexity and to manipulate model for orthographic, axonometric, and perspective views. (Skill)
8. **Create** digital two-dimensional orthographic drawings. (Skill)
9. **Demonstrate** ability to draw human figure. (Skill)
10. **Create** analogue and digital renderings. (Skill)
11. **Manipulate** vector and raster files. (Skill)

Visual Studies II: As Is

1. Apply techniques of image capture, composition, manipulation, post-processing, and output.
2. Proficiently create digital 3D models of medium geometric complexity.
3. Demonstrate basic proficiency in digital and analog rendering including material manipulation.
4. Demonstrate knowledge of architectural graphic conventions and a proficiency in graphic presentation Skills including page composition, drafting, drawing, illustration and diagramming.
5. Implement design concepts and vocabulary such as proportion, hierarchy, balance, and composition.
6. Apply understanding of movie making, audio and video presentation.
7. Create basic maps and representations of geospatial data.
8. Communicate ideas and information both verbally and through writing.

Visual Studies II: Edited

1. **Distinguish** between types of drawing techniques and **apply** as appropriate in architectural contexts (Knowledge)
2. **Demonstrate** understanding of computer hardware and software as used in architectural practice (Knowledge and Skill)
3. **Demonstrate** knowledge of graphic conventions and methods of organization (Knowledge and Skill)
4. **Communicate** ideas and information both verbally and through writing (Gen Ed)
5. **Recognize** and **use** design concepts and vocabulary (Gen Ed and Skill)
6. **Create** digital three-dimensional models (including BIM) of medium geometric complexity and to manipulate model for orthographic, axonometric, and perspective views. (Skill)
7. **Create** digital two-dimensional orthographic drawings. (Skill)
8. **Manipulate** vector and raster files. (Skill)
9. **Create** analogue and digital renderings. (Skill)
10. **Perform** form generating parametric modeling. (Skill)
11. **Create** moving image and audio presentations. (Skill) (Should this be in BTECH?)
12. **Create** maps and representations of geo-spatial data. (Skill) (Should this be in BTECH?)

Barbara Mishara + Alexandra Moll + Jason Montgomery

Site Planning: As Is

1. Explain the different factors to be considered to produce a field study for a given site. (Knowledge)
2. Grade a site using cut and fill to alter existing contours. (Skill)
3. Apply zoning concepts and restrictions including OSR and FAR. (Skill)
4. Understand how climate, topography, hydrology and geology affect site design. (Knowledge)
5. Effectively integrate site planning into the architectural design process. (Skill)
6. Explain how day lighting factors affect site planning and building envelope. (Knowledge)
7. Adapt building envelope to site conditions including views, day lighting, solar gain, wind flow, water bodies and foliage. (Skill)
8. Be familiar with site conditions that enhance the sustainability of a building. (Knowledge)
9. Define and compare rating systems for evaluating sustainable planning. (Knowledge)

Site Planning: Edited

1. **Understand** how climate, topography, hydrology, vegetation, and geology affect site design & building envelope, and enhance sustainability and **apply** it to a design. (Knowledge)
2. **Define** and **compare** rating systems for evaluating sustainable planning. (Knowledge)
3. **Distinguish** between & **determine** the different factors to be considered to produce a field study for a given site & **demonstrate** the ability to create a site plan. (Gen Ed)
4. **Communicate** ideas & information both **verbally** & through **writing**. (Gen Ed)
5. **Develop** & **apply** professional vocabulary. (Gen Ed)
6. **Recall** & **recite** key terms. (Gen Ed)
7. **Research** & **practice information literacy** Skills by researching precedents. (Gen Ed)
8. **Apply quantitative analysis** to design. (Gen Ed)
9. **Grade** a site using cut and fill to alter existing contours. (Skill)
10. **Apply** zoning concepts and restrictions including OSR and FAR. (Skill)
11. **Develop** landscape plan using deciduous and coniferous plants and different ground cover materials. (Skill)

Environmental Systems For Architects: As Is

1. Identify suitable environmental systems for a building. (Knowledge)
2. Prepare simple riser diagrams for plumbing supply & waste systems. (Skill)
3. Define & compare sustainable wastewater, storm water, & fresh water systems. (Knowledge)
4. Select appropriate general & emergency lighting for buildings. (Skill)
5. Explain artificial lighting systems & controls working in concert with maximized natural lighting for buildings. (Knowledge)
6. Select appropriate heating, cooling & ventilation systems for buildings. (Skill)
7. Define active & passive building systems for heating, cooling, & ventilation. (Knowledge)
8. Compare standard building equipment selections to alternative systems & define energy requirements & sources. (Knowledge)
9. Compute heat loss & heat gain for specific construction systems. (Skill)
10. Define & select appropriate fire suppression systems for buildings. (Knowledge)
11. Apply this knowledge to the analysis of projects in design & building technology courses. (Goal)
12. Define & compare rating systems for evaluating & standardizing building equipment. (Knowledge)
13. Define functional components of high performance buildings. (Knowledge)

Environmental Systems For Architects: Edited

1. **Understand** different environmental systems & **apply** suitable systems to a design. (Knowledge)
2. **Define** & **Compare** different environmental systems. (Gen Ed)
3. **Communicate** ideas & information both **verbally** & through **writing**. (Gen Ed)
4. **Develop** & **apply** professional vocabulary. (Gen Ed)
5. **Recall** & **recite** key terms. (Gen Ed)
6. **Research** & **practice information literacy** Skills by researching precedents. (Gen Ed)
7. **Apply quantitative analysis** to design. (Gen Ed)
8. **Prepare** simple riser diagrams for plumbing supply & waste systems. (Skill)
9. **Select** appropriate general & emergency lighting for buildings. (Skill)
10. **Select** appropriate heating, cooling & ventilation systems for buildings. (Skill)
11. **Select** appropriate fire suppression systems for buildings. (Skill)
12. **Compute** heat loss & heat gain for specific construction systems. (Skill)

Building Performance Workshop: As Is

1. Understand alternative energy sources. (Knowledge)
2. Explain the different factors that need to be considered to produce a sustainable building. (Knowledge)
3. Suggest "green" alternatives to both materials & systems. (Skill)
4. Evaluate & compare building material sources, composition, & processing & discuss emerging topics in material science. (Knowledge)
5. Execute building performance analysis using current technologies to evaluate & provide alternative for thermal envelope performance & energy usage. (Skill)
6. Develop a familiarity with Leadership in Energy and Environmental Design (LEED). (Knowledge)
7. Integrate effectively sustainability into the Architectural Design Process. (Happen here or elsewhere?)
8. Explain the economics of sustainability through comparative material & building system choices & life cycle costing. (Knowledge)

Building Performance Workshop: Edited

1. **Understand** & **apply** alternative energy sources to design. (Knowledge)
2. **Explain** the different factors that need to be considered to produce a sustainable building & **demonstrate** the differences. (Knowledge)
3. **Demonstrate** a familiarity with Leadership in Energy and Environmental Design (LEED). (Knowledge)
4. **Explain** the economics of sustainability & **demonstrate** the differences between material & building system choices & life cycle costing. (Knowledge)
5. **Distinguish** between & **determine** different building materials based on their source, processing, and science. (Gen Ed)
6. **Communicate** ideas & information both **verbally** & through **writing**. (Gen Ed)
7. **Develop** & **apply** professional vocabulary. (Gen Ed)
8. **Research** & **practice information literacy** Skills by researching precedents. (Gen Ed)
9. **Apply quantitative analysis** to design. (Gen Ed)
10. **Execute** building performance analysis using current technologies to evaluate & provide alternative for thermal envelope performance & energy usage. (Skill)

Building Technology I: As Is

1. Sketch and hand draft detailed construction assemblies in both 2 dimensions and 3 dimensions.
2. Survey existing conditions.
3. Read and interpret plans, elevations, wall sections and basic details.
4. Analyze assemblies and details, demonstrate understanding of fundamental construction types both by detailed research and visual observation
5. Develop a basic set of working drawings for wood frame and masonry construction.
6. Have clear knowledge of building materials, each material's properties, and how they are fabricated.
7. Identify the key components involved in wood and masonry construction.

Building Technology I: Edited

1. **Understand** the relationship of technology to tectonics and architectural character. (Knowledge)
2. **Recall and recite** the key terms, properties, and fabrication techniques of the materials reviewed in the lectures and readings. (Gen Ed)
3. **Develop and apply** a professional vocabulary of architectural terminology. (Gen Ed)
4. **Recall and recite** the environmental implications of specific materials and types of construction. (Gen Ed)
5. **Sketch and draft** details in orthographic and 3 dimensional views in analogue and digital media. (Skill)
6. **Develop** analog and digital models of construction assemblies. (Skill)
7. **Survey** Existing Conditions (Skill)
8. **Analyze** assemblies and details through research and visual observation. (Skill)
9. **Develop** a coordinated drawing set (plans, section, elevations, details) of a wood and/or masonry structure. (Skill)

Building Technology II: As Is

1. Develop sketches and three-dimensional digital models to produce technically clear and coordinated plan, elevation and section drawings illustrating and identifying the assembly of materials, systems, and components appropriate for a building design.
2. Gather information on various materials and assemblies, assess their merits, and apply this information in the development of models and drawings of a variety of assemblies.
3. Understand the principles of environmental systems' design including embodied energy, sourcing and processing of materials.
4. Understand the sequence of construction as a basis for understanding buildings assemblies and systems.
5. Have clear knowledge of building materials, each material's properties, and how they are fabricated.
6. Research environmental performance and produce a written report with illustrations.
7. Develop knowledge of professional construction drawing elements of composition, title blocks, annotation, and schedules.
8. Generate clear and concise talking points to guide oral presentations of lab assignment reviews.

Building Technology II: Edited

1. **Understand** the relationship of technology to tectonics and architectural character. (Knowledge)
2. **Recall and recite** the key terms and characteristics of the materials reviewed in the lectures and readings. (Gen Ed)
3. **Develop and apply** a professional vocabulary of architectural terminology. (Gen Ed)
4. **Define and compare** the environmental implications of specific materials and types of construction including embodied energy, sourcing, and the processing of materials. (Gen Ed)
5. **Generate clear and concise talking points** to guide oral presentations of lab assignment reviews. (Gen Ed)
6. **Sketch and draft** details in orthographic and 3 dimensional views in analogue and digital media. (Skill)
7. **Develop** analog and digital models of construction assemblies. (Skill)
8. **Analyze** assemblies and details; demonstrate an understanding of fundamental construction types both by detailed research and visual observation. (Skill)
9. **Demonstrate knowledge** of professional construction drawing standards for composition, title blocks, annotation, and schedules. (Skill)
10. **Develop** a professional quality, coordinated drawing set for the given building design(s) including plans, elevations, sections, and details that illustrates and identifies the materials and construction types. (Skill)

Building Technology III: As Is

1. Coordinate and organize a set of construction documents into a logical, sequential, and well-composed set.
2. Transpose drawings demonstrated in class into working drawings.
3. Understand the various parts, symbols, and conventions required in a complete set of working drawings.
4. Become familiar with detailing of masonry shell construction.
5. Redline and pick up redline corrections.
6. ~~Develop fluency with AutoCAD as a design development and drafting tool.~~
7. Consistently develop and execute the drawings in a timely manner.

[These would be added to the current objectives]:

- Demonstrate basic proficiency in creating building information modeling (BIM: Revit) architectural plans, elevations, sections, details, and schedules,
    - Demonstrate a working knowledge of 2D CAD (AutoCAD) technical drawing, scaling, annotation, and blocks.
    - Consistently employ best practices in file and drawing management

Building Technology III: Edited

1. **Understand** the process and requirements of developing a design from a schematic concept into design development drawings. (Knowledge)
2. **Execute work** through a **collaborative process** (Gen Ed)
3. **Generate clear and concise talking points** to guide oral presentations of lab assignment reviews. (Gen Ed)
4. **Understand** the advantages of BIM (building information modeling) as a tool for design development and project delivery. (Skill)
5. **Apply knowledge** of materials and methods of construction, including sustainable principles to the development of details and assemblies for the given design.
6. **Sketch and draft** details in orthographic and 3 dimensional views in analogue and digital

media. (Skill)

7. **Design and analyze** the exterior wall system of the given design based on environmental performance.
8. **Apply knowledge** of professional construction drawing standards for composition, title blocks, annotation, and schedules. (Skill)
9. **Develop** a professional quality coordinated, edited, and organized set of design development documents for a given building design using BIM and CAD. (Skill)

Building Technology IV: As Is

1. Assemble a complete set of construction documents for the 'core and shell' renovation of a 15-story skyscraper.
2. Identify and analyze components and details of skyscraper design.
3. Be versed with regard to curtain wall types, design, detailing and terminology.

Building Technology IV: Edited

1. **Understand** the requirements and parameters involved in the development of construction documents. (Knowledge)
2. **Research and report** on the best practices in detailing the selected materials and methods of construction for a given design. (Gen Ed)
3. **Generate clear and concise talking points** to guide oral presentations of research report. (Gen Ed)
4. **Apply knowledge** of materials and methods of construction, including sustainable principles to the development of details and assemblies for the given design.
5. **Sketch and draft** details in orthographic and 3 dimensional views in analogue and digital media. (Skill)
6.
7. **Demonstrate proficiency** in using BIM and CAD to generate architectural plans, elevations, sections, details, and schedules. (Skill)
8. **Apply knowledge** of building systems (HVAC/M/E/P) to the construction documents of a given design.
9. **Perform** environmental parametric analysis and structural modeling. (Skill)
10. **Develop** a professional quality coordinated, edited, and organized set of construction documents for a given building design using BIM and CAD. (Skill)