Civil Engineering 594: Physical Planning and Municipal Engineering (Elective)

Course Description: 3 cr. U/G. Organization and structure of local government, zoning and planning, subdivision layout, street design, transit service, urban drainage, storm and sanitary sewer, water supply and other public works activities. Preq: Sr St and cons of instructor

Textbook:
- “Physical Planning and Municipal Engineering Notes,” Edward Beimborn, copyright, 2000 available from Clark’s on Oakland Avenue (near Locust).

Prerequisites by topic:
- Understanding of spatial analysis and geography of cities
- Graphical skills
- Ability to do complex calculations on spreadsheets
- College level algebra
- Elements of engineering economics

Course Objectives:

Broad Objectives

The objective of this course is to provide an understanding of the interface between urban planning and civil engineering practice as it affects the development process of land and the provision of urban infrastructure.

Learning Outcomes

Upon completion of the course, students should have an understanding of:
- The nature of physical planning and municipal engineering practice with emphasis on how they might be performed in a small urban or suburban community.
- The process used for the development of land as it considers issues in neighborhood planning, subdivision layout, mapping and platting, street layout and design, provision of utilities—electricity, water storm sewer, sanitary sewer, drainage and flooding.
- How engineers and planners interact with local government, organization and structure of local government and general public works activities.
- Knowledge of data required for land use planning and design.
- Knowledge how physical factors affect project economics and feasibility.
- Knowledge how land use decisions are made in local governments.
- Ability to make tradeoffs with multiple factors in project planning and design

Topics Covered:

- Organization of Local Government, Role of Planner, Municipal Engineer
- Land Development Process
  - Regional Context for planning
  - Preparation and Content of Neighborhood Plans
Subdivision of Land: Principles, street and block patterns, sites, development of maps and plats, zoning restrictions, local approval process, financial feasibility

- Provision of Government Services
  - Transportation
    - Street layout and design
    - Transit services
    - Parking facilities
    - Street lighting
    - Street maintenance

- Public Utilities
  - Drainage system and storm sewers, effects of urbanization, principles of layout and design
  - Sanitary sewer systems
  - Water supply system
    - Solid Waste and Recycling

Projects

- Develop a neighborhood plan for an area of approximately one square mile
- Subdivision design
- Attend a meeting of a local governmental board or plan commission

Written Communications

- Prepare written reports for each of the projects including layout diagrams, plan and profile drawings and financial analysis.

Class Schedule: Two 75-minute sessions per week.

Contribution of Course to Meeting the Professional Component:

The neighborhood planning project and subdivision design projects are major components of the course. This is a semester long effort which is the primary focus of the course lectures and schedule. The following steps are involved:

- Identify a site.
- Work in groups to gather data on the site soils, drainage, topography, property ownership, zoning and local government context.
- Develop goals for their designs, which provides mixed land uses and considers social, economic and political factors as well as site characteristics.
- Develop a neighborhood plan for the site following the goals and document it in a written report.
- Design a subdivision layout that is consistent with the neighborhood plan.
- Develop a spreadsheet to be used to conduct an economic feasibility analysis of a subdivision.
- Develop plan and profile diagrams for a selection of streets in the subdivision.
- Develop a storm water drainage plan for the site.
- Apply the spreadsheet to estimate development costs and to determine if the design or site is feasible economically.
- Document the subdivision plan in a written report including recommendations for implementation.