

**Civil Engineering Service Projects (CESP)**  
**CE 25600, CE 35600, and CE 45600**  
**Course and Projects Descriptions---Fall 2007---Lloyd H. Ketchum, Jr.**

**Catalog Description:** CE 25600, CE 35600, and CE 45600. Civil Engineering Service Projects (Variable credit) Ketchum; Prerequisite: Instructor permission  
Weekly meetings: W 5:10 pm, typically for 30 minutes.

Civil Engineering Service Projects (CESP) is a course that partners teams of students with local community service organizations. Projects involve strong technical content, significant design, and multidisciplinary effort and a strong communication component. These projects have a civil engineering emphasis, but benefit from enrollment of most other undergraduate majors. CE 25600, CE 35600, and CE 45600, which are all entitled Civil Engineering Service Projects, bring first year and sophomore students (CE 25600), juniors (CE 35600), and seniors (CE 45600) together to form multidisciplinary teams across the curriculum, to assist local community service organizations. Students may enroll for variable credits in more than one semester. For example, a student may enroll for one credit per semester during the first three years and for two credits as a senior. It is unusual for a student to enroll for three credits for only one semester. Seniors and returning CESP participants assume leadership of the teams

**General Course Procedures:** Each CESP Team will meet during the first week to become familiar with the project, and to complete a written proposal to be approved by the instructor and the client, a cooperating local government and community service organization. The proposal will include well-defined project objectives; identification of tasks and assignment of project responsibilities; provide a schedule; and provide a procedure for reporting participant activities. During the semester, several team written progress reports are required, which includes a proposal during the second weekly meeting, and progress reports at the 6<sup>th</sup>, and 10<sup>th</sup> weekly meetings. A final written report is required for each team, and in most cases, one or more oral reports will be made to the client. Each student will submit an e-mail weekly progress report Tuesday evening before 6:00pm.

Remember, a typical 3-credit course meets three hours a week, and normally requires three to six hours of outside effort, and courses like this typically require more individual effort. Therefore, in this course you should schedule three hours per week for each credit. It is important to maintain your schedule each week, and not fall behind.

The instructor will assign the final class grade based on quality and quantity of participation. However, each participant will be required to submit weekly progress reports and a final semester evaluation of his or her own performance, and evaluate the other project participants. The final evaluation will include suggested grades and a ranking of team members based on their benefit to the final project.

**Student Participation**

If you are interested in learning about participation in these projects, please contact:  
Lloyd H. Ketchum, Jr.: E-mail [ketchum@nd.edu](mailto:ketchum@nd.edu) Office 156 Fitzpatrick Hall.

CESP Web Site: <http://www.nd.edu/~cegeos/Service/Local.htm>

## **Descriptions of Possible Project ---Fall 2007---Administered by Lloyd H. Ketchum, Jr.**

The Department of Civil Engineering and Geological Sciences will coordinate service projects with two clients during the fall 2007 semester, the City of South Bend Potawatomi Zoo and the YMCA Camp Eberhart. Other clients may be added in the future. The projects are cross-curriculum team projects that have a civil engineering emphasis, but benefit from input by other engineering and many non-engineering majors. These service projects are offered through the courses CE 25600 (first-year and sophomores), CE 35600 (juniors), and CE 45600 (seniors), and are entitled "Civil Engineering Service Projects."

### **CESP at the South Bend Potawatomi Zoo, an AZA member.**

The Potawatomi Zoo is dedicated to connecting people with nature, and is one of the areas top two attractions, home to nearly 450 animals. The American Zoo and Aquarium Association (AZA) accredit the Zoo. Look for the AZA logo whenever you visit a zoo or aquarium as your assurance that you are supporting a facility dedicated to providing excellent care for animals, a great experience for you and a better future for all living things. With its more than 200 accredited members, AZA is a leader in global wildlife conservation and your link to helping animals in their native habitats. For more information, visit [www.aza.org](http://www.aza.org)

Many CESP Zoo projects are developed to prepare a preliminary design of an exhibit, which includes a technical written document that could be used by a qualified contractor to submit a cost proposal, and an attractively written and illustrated document that could be used by the zoo staff to solicit funds for its construction. Each team is expected to consider methods of generating revenue as they develop each exhibit. For example, one previous team helped to develop the zoo railroad, which now generates revenue that is used to improve exhibits.

### **Potawatomi Zoo Mission Statement.**

Potawatomi Zoo's mission is dedicated to the enrichment of the community by promoting wildlife conservation and awareness of endangered species. In order to fulfill our commitment, we serve as a public education institution, as a scientific center, and as a cultural and recreational agency.

### **Potawatomi Zoo Projects.**

The following are possible CESP Zoo projects for fall 2007:

Otter Exhibit Design. A spring 2007 CESP Team prepared alternative preliminary designs of an exhibit for North American River Otters. The final design will need to conform to AZA standards, and allow quality of life for the otters and an attractive interaction with the visitors. Continuation of this project will include selection, refinement, and development of a detailed final design. Identification of utility needs will be required, including a water treatment system to allow water recycling.

Flamingo Exhibit Improvements. A spring 2007 CESP Team prepared a preliminary report on improvements to a Flamingo exhibit to increase the number of birds. A more detailed design is required.

Zoo Way Finding. A spring 2003 CESP Team designed, constructed, and installed a series of signs to direct visitors to the zoo from throughout the City. They also presented a preliminary development for way finding inside the zoo. A new CESP team can complete the

development of the way-finding project inside of the zoo, and enhance zoo exhibit information, including fundraising.

A First Overview Sign. This project requires preparation of artistically pleasing sign with lists of proposed new exhibits or improvements, and opportunities for zoo patrons to support the zoo. Way Finding and Educational signs are expensive. The first sign includes encouragement for patrons to fund Way-Finding signs, which possibly include patron name and picture. Similar educational signs at selected exhibits should be included. The first sign would identify needed improvements and proposed new exhibits, and identify funding needs. Team members who are artists, students familiar with artistic sign manufacture, and writers will benefit this and several other CESP teams.

Identification of Notre Dame Enriched Exhibits. Notre Dame Students have participated in CESP and CESP-like projects continuously since fall 2000. Notre Dame Alumni and other visitors may enjoy learning about this involvement, and may be encouraged to support funding of the CESP activities or exhibits with Notre Dame involvement. This CESP team will identify and prepare appropriate informational signs.

Environmental Education at the Zoo. “Students for Environmental Action” is a student group at the Notre Dame. The purpose of this group of concerned Notre Dame Students is to educate the Notre Dame and surrounding communities on the importance of environmental issues, not only in the political arena, but also in terms of the social, economic, and personal ramifications of these issues in every day activities. These goals shall be accomplished through a variety of activities including but not limited to education in local schools, support of a campus environmental awareness week, and efforts to recycle. Interaction with this group by a CESP Team could lead to development of important environmental education activities at the Zoo, such as recycling, composting, and conservation.

Recycling for Animal Enrichment. This project will require the CESP Team to develop methods of funding recycling containers and signs. The AZA encourages use of signs to persuade visitors to recycle. The signs report that proceeds from recycling will support animal enrichment. Animal enrichment at the zoo is much like pet owners who buy toys for their pets.

Animal Enrichment Days. This CESP team will develop and staff animal enrichment days at the zoo. One alternative involves elementary school children. The CESP Team develops zoo animal enrichment techniques, teaches the elementary school children to prepare these enrichment items, and then hosts a day at the zoo. Two animal enrichment examples include a papier-mâché zebra filled with meat and given to the lions, and a PVC pipe filled with crickets and given to monkeys. The elementary school children and other visitors have an opportunity to see animals in unusual feeding circumstances and animal life enriched.

Zoo Tree Farm. Spring and fall 2006 teams developed a tree farm that includes a variety of 80 small flowering and shade trees. The trees are growing in pots, and will need to be re-potted periodically until they are sufficiently large for planting in different zoo exhibits. The previous teams have developed a long-term strategy for expanding and operating the tree farm. Future efforts will focus on caring for and repotting the trees. This project is unlikely to include new participants, except to help as volunteers when the trees require repotting.

A Zoo-Wide Consideration of Constructed Wetlands. Fall 2004 and spring 2005 teams investigated the use of a constructed wetland as a means of water conservation, water treatment, and pond esthetic improvement for the front pond exhibit. This project was continued in fall 2006, with recommendations for integrating a system with the proposed South American exhibit. Future CESP teams could investigate other exhibits around the zoo that would be candidates for

similar wetland projects, the motivation being that the water saved by such projects would eventually pay for the capital cost.

Notre Dame Zoo Club. This project is a continuing project from fall 2005. That CESP group outlined a proposal to form a Notre Dame Zoo Club as a recognized University Club. They had fun working with zoo staff in assembling special "winter days" for zoo visitors and members. The club would support the zoo staff at special events. This activity may be a volunteer effort instead of a formal CESP course project.

You can learn more at the Potawatomi Zoo web site: <http://potawatomizoo.org/>

### **CESP at YMCA Camp Eberhart**

The YMCA has a long and proud history in camping activities and Camp Eberhart has been serving campers and their families for nearly 100 years. Situated on beautiful Corey Lake, YMCA Camp Eberhart is five miles west of Three Rivers in southwest lower Michigan, and about 50 miles from Notre Dame. The camp has nearly 200 wooded acres with over a mile of shoreline on Corey Lake, and trails leading back to the shores of Spatterdock Lake. Guests are housed in a variety of scenic facilities from rustic, screened cabins to climate-controlled lodges. Other facilities include a centralized dining and meeting hall, open playing fields, high ropes course and climbing walls, scenic horseback riding trails, nature and hiking trails, volleyball and basketball courts, archery and rifle ranges, an astronomy observatory and an outdoor chapel. The well-equipped waterfront provides opportunities for swimming, rowing, canoeing, sailing, windsurfing, fishing and water-skiing.

Earlier CESP projects have result in construction weekends. CESP students design projects and direct construction during a weekend where volunteers help. Typically, the CESP and volunteer students arrive at Camp Eberhart Friday evening and visit the construction site to learn the project details. Then they have a camp dinner, visit the camp, sing and roast marshmallow around a campfire, and then spend the night. Saturday morning they have breakfast, and begin working. After the noon lunch, the team splits in half. One-half enjoys the high ropes course, while the other half returns to work. At mid-afternoon, they switch roles. After the evening meal, some members return to campus and others stay to enjoy disc golf, hiking, or some other camp activity. Occasionally, teams stay Saturday night to continue construction on Sunday. Previous weekend construction projects include, a wooden walk bridge, an outside classroom connected to the Walk Bridge, an outdoor amphitheater, additional seat for the outdoor chapel, and a nature trail.

The following are possible CESP Camp Eberhart projects for fall 2007:

Nature Trail Enhancement. A fall 2005 CESP team proposed outlined a nature trail around Spatterdock Lake, which is a wetland. A spring 2006 CESP team, with volunteers, marked and cleared a portion of the intended trail. The fall 2006 CESP team began development of the educational aspects of the trail. The emphasis was on research of animals, plants, and geology of the nature trail. Another research study focused on trail maintenance and erosion control. The spring 2007 CESP team focused on developing signs to guide visitors to the Nature Trail.

Possible continuing Nature Trail projects include developing and implementing plans to relocate ravines, manage the nearby forest, and surveying the trail using GPS to mark locations

along the trail. Another project involves an old dock and walkway that leads into the wetland, and needs a replacement design and construction.

Nature Trail Educational Features. The spring 2007 team research will aid in developing educational units associated with the Nature Trail. The first educational project could be the placement of plaques or trail mile-point locations. This project would include designing a sensible layout of the plaques to be used for orienteering, biological, and geological activities. Alternatively, a small three-fold pamphlet, or flip charts, could be created to assist in the identification of plants, animals, and geological features along the trail.

The final project could be the design of an observation structure along the new trail. Using mature trees for a support, this tower-like structure would serve as a place for users to observe wildlife and the wooded surroundings from a vantage point clear of lower shrubs. A team would be assigned with designing the structure and soliciting estimates. Many support structure design options exist, including a tree house, a pyramid, a Native American log house, and a trapper's cabin. This project will explore the appropriateness of these and other support structures.

Numerous project possibilities exist with the access provided by the spring semester's work completed at Camp Eberhart. The trail affords many opportunities in itself and in future development.

Utility Upgrading. A spring 2007 CESP team started an evaluation of the camp's electrical distribution system. This project needs completion, because it will be included in the next Capital Dollar campaign. Tasks that remain incomplete include location of buried and aerial wires and devices, wire type and size, protection devices, estimates of full load amp reading per conductor, AIC Ratings, and preparation of drawings and documentation of existing facilities and equipment. Another part of the project would be suggestions for upgrades including provisions for growth, and identification of standby-power facilities.

A similar study of other camp utilities may be started.

Stone Cabin Renovation. The stone cabins are rustic, a signature piece of the camp, and many Alumni have fond memories of these accommodations. The current State of Michigan regulations and the changing taste of the consumer are forcing a rethinking of the long-term use for these buildings. This project will propose one or more alternative methods to bring the stone cabins into the 21st century. This would include but not be limited to comfortable space of 20 campers in each cabin, rest rooms, and counselor quarters. One option could be saving just the front facade of stone as part of the new structure, and rebuilding the main structure.

You can learn more at the YMCA Camp Eberhart web site: <http://www.campeb.org>.

### **CESP with Other Future Clients**

Earlier CESP participants suggested two possible future clients, the University of Notre Dame, and local school systems. CESP efforts could focus on developing appropriate projects and client relationships, if sufficient student interest exists. For example, at Notre Dame, environmental issues may be addressed, and a local grade school could be approached to develop an after-school environmental awareness program. Green roof projects could be considered with either client.

### **Course Registration**

Contact Lloyd H. Ketchum, Jr. for information and registration information: [ketchum@nd.edu](mailto:ketchum@nd.edu), 1-5380, Room 156 Fitzpatrick Hall.