

**FLORIDA WATER ENVIRONMENT ASSOCIATION**

**STUDENT DESIGN COMPETITION  
2016-2017 GUIDELINES**



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This event, sponsored by the Florida Water Environment Association (FWEA), requires that student teams design and present a project of their choice that relates to the field of water/wastewater engineering, water resources, or other environmental topics. Any questions regarding the program guidelines should be directed to the Students & Young Professionals (S&YP) Committee Chair:

UNIVERSITY*	S&YP Committee Chair
Florida A&M University Florida Atlantic University Florida Gulf Coast University Florida Institute of Technology Florida International University Florida State University University of Central Florida University of Florida University of Miami University of North Florida University of South Florida	Tyler Smith Carollo Engineers 10117 Princess Palm Avenue, Suite 340 Tampa, FL 33610 Work: 813-906-4606 Email: tsmith@carollo.com

\*Others Welcome to Participate

**INTRODUCTION**

The FWEA Student Design Competition (SDC) is intended to promote a “real world” design experience for students interested in pursuing an education and/or career in water resources and environmental engineering and sciences. This competition tasks teams of student members within FWEA to design and present a project solution meeting the requirements of a problem statement that they have worked on together as a team. This competition is intended for both undergraduate and graduate students, typically completing a capstone project.

**STUDENT DESIGN COMPETITION**

Student design teams will be able to compete in one of two categories, wastewater design (WW) or environmental design (ENV). The Wastewater design is intended to include the traditional wastewater collection and treatment design projects, such as hydraulic capacity design, upgrades to existing systems, biosolids handling, etc. The Environmental design is intended to cover current contemporary engineering topics, including sustainability, water reuse, wetland construction, stormwater, urban runoff, etc. At this time, projects related to drinking water treatment or distribution are not accepted. The students will indicate on the Entry Form the category in which they will participate (WW or ENV). **Final determination**

**of project category is at the discretion of the S&YP Chair.** The competition consists of two portions, the written submittal and the presentation.

The scope and extent of the project should be at the level of a junior, senior, or graduate engineering/science student in a design or capstone course. Students may participate in the competition if they are not enrolled in a capstone course. Students are expected to work together as a team to recommend a solution, with little assistance from an advisor and/or professor. Students may use whatever references or resources, with appropriate citations.

**Students are expected to perform the necessary calculations for the project. This is not intended to be solely a research project or a literature review, but a comprehensive design project.** Although some initial literature review and/or research will be required, the bulk of the project should incorporate pertinent calculations for the design.

For example, if the project involved a wastewater treatment plant expansion, judges would expect that the team performed the following:

- Hydraulic profile
- Preliminary sizing of major equipment (aeration basins, clarifiers, chlorine contact chambers, etc.)
- Incorporate information from different manufacturers
- Population analysis to determine design flow rates
- Preliminary cost evaluation
- Decision matrix (provide why you ended up with that particular process or design etc.)

Environmental projects may include the following:

- Reuse
  - Methods for reuse
  - Irrigation: pumping requirements, pipeline sizing
  - Deep Well/Aquifer recharge: injection well sizing, required depth, injection flow/pressure
- Wetland Construction
  - Impacts (economic, social, etc.)
  - Decision matrix (weighted ranking system/ alternative analysis)
  - Water quality parameters
- Stormwater
  - Runoff flow/volume methodology and calculations
  - Stormwater pond sizing, retention time, capacity, inlet/outlet pipe size requirements
  - Water quality parameters

All of the design work should be submitted in the design report, clearly labeled and referenced.

Teams will be evaluated by a panel of judges selected from the FWEA community and will be scored based on the written and oral presentation skills. The written and presentation

skills will be evaluated separately and added together for a total score (see Exhibit A for the sample judges scoring sheets). The presentations will be held on **Sunday April 23, 2017**, in Palm Beach at the Florida Water Resources Conference ([www.fwrc.org](http://www.fwrc.org)).

Written data (submitted in electronic format) will be evaluated by the judges prior to the oral presentations. The data will be available to the judges during the presentation for their reference. After the presentation, judges are permitted to ask questions based on information provided in both the written submittal and the presentation.

## ENTRY FORM

Each team shall submit an entry form for the competition. Each university is permitted to send up to two teams to the competition, one in each category (WW and ENV). The team names shall be referred to in the following manner: "University-Category". For example, UCF-WW or FGCU-ENV.

There is no entry fee for the SDC. Students and other audience members are responsible for their own travel arrangements to attend the SDC. If interested in attending other portions of the conference, registration information may be found at [www.fwrc.org](http://www.fwrc.org). Each team must also submit the Participation Form at a later date that includes the names of team members and presenters.

## PRIZES

FWEA is providing prizes for the 2017 program. The prizes shown below, which are subject to change each year, will be awarded following the Student Design Competition at FWRC. Please note that each team participating in the event will receive a participation bonus for their team regardless of placement based upon the presentations and written submittals. Students will indicate on the Entry Form where the check should be sent.

PRIZE	AWARD	MONETARY VALUE
First Place (Wastewater Design)	Norm Casey Scholarship WEFTEC 17 Travel Allowance*	\$1,000 \$4,000
First Place (Environmental Design)	Norm Casey Scholarship WEFTEC 17 Travel Allowance*	\$1,000 \$4,000
All other teams	Participation Bonus	\$500

\*The first place teams will be required to present their projects at the Water Environment Federation (WEF) Student Design Competition, to be held at WEFTEC 17 in Chicago, Illinois, – September 30 - October 4, 2017. The winning teams from each category (Wastewater and Environmental) should follow the WEF deadlines and guidelines for the national competition, located on their website at <http://www.wef.org/PublicInformation/page.aspx?id=136>. Note that some items may be due as early as May.

The first place winners in each category will be announced at the conclusion of the SDC and during the FWRC President's Welcome Reception on Sunday evening in the main Expo Hall. The winners will also be announced at the Florida Water Resources Conference (FWRC) Awards Luncheon. Team members or designees of the team are encouraged to attend the Awards presentation.

## **GENERAL REQUIREMENTS**

The general requirements for participation in the competition are:

- Team size will be limited to a maximum of eight students per team. One team per school is allowed in each design category. It is recommended that schools with more than one team interested in a design category host an internal competition to determine the team who will compete at the FWEA Student Design Competition. A school may send a maximum of two teams, one in each design category.
- The sponsoring professor should provide limited assistance to the students on an as needed basis, keeping in mind that this project should be the students' opportunity to showcase their knowledge gained throughout their time in school.
- The engagement of the professional community and the local chapters of the FWEA is strongly encouraged. Project topics, design data, and feedback may be obtained from members of the professional community.
- Attendance at the Student Design Competition at FWRC in Palm Beach on **Sunday April 23, 2017**.
- Each member of each team must be a WEF/FWEA Student Member in good standing who:
  - Has been selected by his/her university to participate.
  - Have filed an application with their FWEA student chapter and paid the required dues prior to **April 12, 2017**. The same holds true for continuing Student Members.
  - Student members who have graduated at the time of the FWEA Competition will be allowed to participate, if they were a registered student within the last 6 months. Students who have graduated must also be a member of WEF/FWEA.
- All entry materials become the property of the FWEA.
- A representative of FWEA will preside during the competition and ensure that there is adherence to the time schedule and event rules.
- The first place team in each category should be prepared to participate in the National Student Design Competition at WEFTEC 17 in Chicago, Illinois in September 2017. Some travel funds are provided as part of the first place award.

## STUDENT RESUMES

Students may submit resumes at the same time as the written data submittal. Student resumes will be reviewed by industry professionals prior to the competition. Students will receive a copy of their resume with constructive feedback after the competition. After the SDC, a brief career panel/resume workshop will be held, where students will have the opportunity to speak directly with industry professionals and receive additional feedback. **Students should also bring hard copies of their resumes with them to the competition/resume workshop.**

After students receive feedback, we ask that they submit a revised resume within one week of the competition, which will be distributed to all Gold-level and Utility sponsors. Resume deadlines are listed under the Significant Submittal Items and Dates Section.

Guidelines for student resumes include:

- ❑ Each student is limited to one page.
- ❑ The resumes for each team shall be combined and submitted as a single pdf document with the following file name format: "School\_Category\_Resumes" (example: "FIU\_WW\_Resumes").
- ❑ The resumes are to be separate from the written submittal (report).
- ❑ Late resumes will not be accepted.
- ❑ Submitting a resume is not mandatory, however it is strongly encouraged. Teams will not be penalized for not submitting resumes.

## WRITTEN SUBMITTAL REQUIREMENTS

Design documents shall be compiled in Adobe Acrobat (pdf). Competition entries shall be submitted on a CD or by email. Special indices, bookmarks, or other features are appreciated, but not required.

The following shall be included in the written submittal (in the order shown):

- ❑ **Abstract/ Executive Summary** – Provide a brief overview/ summary of the design, not to exceed 200 words. This section is not counted as part of the 20-page limit.
- ❑ **Team Member Roles**– Provide a summary of each team member's role in the effort. This section is not counted as part of the 20-page limit.
- ❑ **Report**- A discussion of the design problem statement, approach, and solution (not to exceed 20-pages\*). The discussion must cover the salient facts upon which the recommendation is made, give a clear analysis of the evaluation technique, and present a clear recommendation of action. Relevant data should be presented in the discussion in a

clear and logical format. All elements shown on the judging score sheet should be addressed.

- Formatting: 1-inch margins on all sides; Calibri, Arial, or Times New Roman Font with a minimum 11-point font size. Reports may be single or double-spaced.
- Color diagrams, tables, graphs, charts and photographs that reflect the unique features of the project. Each graphic/photo is to be identified with an appropriate descriptive caption and may be embedded in the report or included at the end in appendices. It is recommended that smaller, pertinent graphics be embedded in the body of the report while large and supportive graphics be included in the Appendix. It is not recommended to have all graphics only in the Appendix.
- References: Any information not original to the design team (including text and graphics) must be appropriately referenced. Carefully review each section of the written submittal to ensure references are cited appropriately, **including in-text citations**.\*

\*Noncompliance may result in scoring penalties (see Penalties section).

- **References/Acknowledgements-** Give credit to your sources of information and outside support. This portion does not count as part of the 20-page limit.
- **Supporting Documentation** – Provide drawings, calculations, tables, vendor submittals, cost estimates, and other voluminous documents as appendices. There is no limit on the number or length of appendices to include at the end of the report. This portion does not count as part of the 20-page limit.

The judges will be directed to focus their review on the Report section of the submittal. **Teams shall ensure that their complete analysis and design solution may be understood from the 20 pages of material provided in the Report.**

Teams are encouraged to use a checklist to ensure all necessary documents are included in the written submittal. Failure to include all documents may result in a lower score.

## **PRESENTATION REQUIREMENTS**

Each team will be allowed a thirty (30) minute block of presentation time, including a two (2) minute setup, twenty (20) minute presentation directly followed by an eight (8) minute question and answer session. There will be time warning signs held up during the presentation when there are 5 minutes and 1 minute remaining to help the students from going over their time allotment. To stay on schedule, the presentation will be kindly cut off after 20 minutes, even if there are slides remaining. Therefore, time management and practice are important. There will be two rooms for the presentations, one for the Wastewater Category, and one for the Environmental Category. Typically, both SDCs will occur simultaneously.

This year, **teams are asked to bring handouts of their presentation slides for the judges**. These should be front and back with three slides per page with the notes sections.

Please provide six (6) copies of the handouts. The judges will use these during the presentations so last minute changes should be limited.

Teams may consist of up to eight members. However, a maximum of four team members shall be permitted to present and answer questions. If there are four or less team members on the presentation platform, each member is expected to have a role in the presentation and in answering questions. If required, one additional team member (a fifth team member) may be on the presentation platform but shall be dedicated solely to advancing the presentation slides. Additional team members are not permitted on the presentation platform or allowed to speak during the presentation or the question and answer period. However, they are encouraged to show their support as audience members. All presenting team members (excluding the A/V member) are encouraged to participate in the question and answer session. Questions are drawn from the judging panel only. The presentation rooms will have a standard podium, screen, laptop, and projector. The laptop supports PowerPoint 2007.

### **SIGNIFICANT SUBMITTAL ITEMS AND DATES**

Each entry will consist of the following:

- ❑ An official **Entry Form** submitted to the S&YP Chair by 11:59 pm on **February 10, 2017**. This submittal does not need to identify team members, but must include contact information for each team planning a submittal. Please contact the S&YP Chair in advance if a university has multiple teams interested in one category and is intending to hold an internal competition after the Entry Form deadline.

The entry form is to determine what category a team is placed in. If a team's topic changes after the entry form has been submitted, the team must contact the S&YP Chair immediately to ensure their new topic still fits within their category.

- ❑ A **Conference Call** will be held in March 2017 (tentatively scheduled between **March 1-11, 2017**). An exact date/time will be determined in February. A conference call number and passcode will be sent out in late February to each team leader (listed on the Entry Form). **At least one team member from each team is required to call in.** The purpose of the conference call is to review competition rules and to answer any questions the students may have. Please notify the S&YP Chair of any conflicts prior to the conference call.
- ❑ A **Participation Form** showing final team member names and presentation title, submitted to the S&YP Chair by 11:59 pm on **April 12, 2017**. The presentation title should be related to the project topic listed on the Entry Form.
- ❑ A project written data submittal must be received by the S&YP Chair no later than 11:59 pm on **April 12, 2017**.
- ❑ Preliminary student resumes must be received by the S&YP Chair no later than 11:59 pm on **April 12, 2017**.



- The presentations will be made on **Sunday April 23, 2017** in Palm Beach at the Florida Water Resources Conference. The S&YP Chair needs to receive the final presentation prior to the competition to check for technical difficulties prior to the start of the competition. Teams will need to verify that their presentation is on the general laptop before the competition. Students may bring their presentations on a portable flash drive to transfer it to the general laptop.
- Revised student resumes must be received by the S&YP Chair no later than 11:59 pm on **Monday May 1, 2017**.

## **JUDGES AND JUDGING CRITERIA**

The event will be judged by an impartial panel consisting of members of academia, public agencies and private consulting practices. The judging team shall have no direct affiliation/representation with any college participating, owner project, or engineering firm involved as part of the projects they will be judging. All written submittals and presentations will be judged by the same panel of judges for each category, Wastewater and Environmental.

The FWEA is a multi-disciplined environmental organization dedicated to quality in practice of the profession. Accordingly, judging will be based on the elements outlined below and on the scoring sheets provided in Exhibit A. Judges will use the scoring sheets provided as the basis for judging of the students' designs. The FWEA presiding official will hold the results of the written submittal scores until after the presentations are complete and scored. The scoring sheets will be collected after the presentation and the scores will be added to the written scores and tallied. The team with the highest score in each category will be awarded First Place. In the event of a numerical tie, the winner will be decided by the scoring of the presentations. If this ranking also results in a tie, a coin shall be flipped to determine the first place finishers (and state representatives to WEFTEC 17). The final scores may not be released; however, comments and feedback from the judges will be compiled and provided to the students after the Student Design Competition.

A compilation of comments and recommendations from past judges is provided on the SDC website: [http://www.fwea.org/student\\_design\\_competition.php](http://www.fwea.org/student_design_competition.php).

## **WRITTEN SUBMITTAL**

### **Technical**

Were the instructions followed in the delivery of the written data? Does this submission substantially conform to the guidelines? Was there a clear final recommendation? Was it easy to follow the team's approach in reaching their final recommendation?

### **Appearance and Structure**

Is the written submittal clear, easy to read and navigate? Does it have a logical flow? Was the appearance of the data and presentation materials neat, organized, and professional?

Is it free of grammatical and spelling errors? Did the report stay within the page limit? Was the report broken down into sub-headings that made it easy to follow?

## **PRESENTATION**

### **Content**

To what extent was the subject of interest conveyed to a technical audience? Did the team give credit for source of material or contribution? How much knowledge of subject was exhibited? Was work independent and original? Was subject technical or general in nature? Was the approach effective in solving the problem statement? Was the problem clearly stated? Did the students present a viable solution to the problem? Was there any innovation or “thinking outside the box” on the design approach? Were the design challenges addressed and overcome?

### **Organization**

Were there an appropriate number of slides? Were the slides cluttered with too many details? Was there enough time for the audience to understand the information on each slide? Was there sufficient background information provided to introduce the audience to the subject? Were facts developed in logical and continuous sequence? Was there a definite conclusion and was it adequately based on the facts or data presented?

### **Delivery and Effectiveness**

Were the words distinctly pronounced and did presenter use proper volume in delivery? Did the presenter use proper English, and was the vocabulary sufficient? Was personal appearance appropriate? Were there any distracting mannerisms? Was the manner of delivery (conversation, memorized, read from manuscript) satisfactory? If visual aids were used, how effectively were they used? Was the presentation within the time limit allowed for presentation? Were the speakers talking at an appropriate pace or were they rushed?

### **Discussion**

Did the presentation evoke spontaneous questions from the panel? Did questions indicate the need for clarification of facts presented or were they merely of the type seeking additional information? How readily and with what self-assurance did the speaker answer questions? Did the answers indicate knowledge of subject beyond that disclosed in the original presentation?

## **PENALTIES**

Penalties may be assessed for misconduct by any of the teams and are at the discretion of the S&YP Committee.

Penalties may include:

- Points taken off from the final score

- Disqualification of an individual team
- Disqualification of a school

Some of the items that can lead to penalties include:

- Failure to submit entries on time
- Failure to comply with abstract or report guidelines
- Failure to comply with presentation guidelines
- Inappropriate assistance from a mentor, professor or other outside source
- Plagiarism, all sources and resources must be properly cited
- Failure to obtain WEF/FWEA memberships
- Misconduct by the team, sponsors or others associated with the team

## **SPONSORSHIPS**

In addition to FWEA funding, the SDC is largely supported by the generous financial contributions of sponsors. If you know of an organization who is interested in sponsoring the SDC, please have them contact the S&YP Committee Chair below. All sponsors will receive recognition for their support and their logo will appear on all SDC materials and the FWEA S&YP webpage.

## **INTERNET LINKS**

[http://www.fwea.org/student\\_design\\_competition.php](http://www.fwea.org/student_design_competition.php)

[www.fwea.org](http://www.fwea.org)

[www.fwrc.org](http://www.fwrc.org)

## **QUESTIONS OR COMMENTS**

Please review the entire SDC Guidelines and contact the S&YP Committee Chair for any clarification on any of the rules or guidelines of the program. The Chair may be contacted at:

Tyler Smith  
Carollo Engineers  
10117 Princess Palm Avenue, Suite 340  
Tampa, FL 33610  
Work: 813-906-4606  
Email: [tsmith@carollo.com](mailto:tsmith@carollo.com)

**Good luck and thank you for your interest and support!**

**EXHIBIT A**

**SAMPLE JUDGES' SCORING SHEETS**

**Sample Judges Scoring Sheet  
2017 Student Design Competition  
Written Report**



Name of University: \_\_\_\_\_

Title: \_\_\_\_\_

Judge: \_\_\_\_\_

Category	Description	Max Points	Score	Comments
<b>Technical (70 points)</b>	Introduction, statement of problem, background information (effective, appropriate amount of detail, clearly state the problem's relevance to the industry)	5		
	Continuity (logical sequence of steps to solution)	10		
	Conclusion (recommendation clearly stated, based on logical steps to solution)	10		
	Solution (is the recommended solution feasible, logical for problem statement)	15		
	Creativity, Innovative Approach, Applicability	5		
	Knowledge of Subject & Content (Demonstrates understanding of background, meets objectives with use of facts, not supposition)	10		
	Economic Analysis (feasibility, clearly presented, assumptions stated)	10		
	References and Acknowledgements (credit to resources & help, participants' roles identified, appropriate in text citations)	5		
<b>Appearance and Structure (30 points)</b>	Formatting and Appearance (logical organization of report, table of contents, all sections included, neat, professional appearance)	10		
	Grammar, Spelling & Overall Technical Writing	10		
	Visual Aids (graphs, supporting info, pictures, etc.) presented clearly, legible, easily located and referenced to/from text, relevant to project, effective, supports the text, good description/caption	5		
	Entries submitted on time	5		

**Total Written Score (100 Points): \_\_\_\_\_**

**Sample Judges Scoring Sheet  
2017 Student Design Competition  
Presentation**



Name of University: \_\_\_\_\_

Title: \_\_\_\_\_

Judge: \_\_\_\_\_

Category	Description	Max Points	Score	Comments
<b>Content (45 Points)</b>	Subject Matter (general or technical, relevant to design, appropriate amount of detail)	20		
	Contribution to industry (was the importance clearly conveyed or was it reporting on basic knowledge, did they conduct independent analyses or did they only reference previous work, is the design innovative)	10		
	Knowledge of subject & content	15		
<b>Organization (20 Points)</b>	Introduction (team members, background, objectives, outline presented clearly, elicited audience interest)	5		
	Continuity (facts developed in a logical sequence, transitions well)	10		
	Conclusion (conclusion is clearly stated and is reasonable based on facts presented)	5		
<b>Delivery and Effectiveness (25 Points)</b>	Schedule (effective use of the time allowed, and appropriate amount of time spent on the various sections of the presentation)	5		
	Organization (vocal delivery, conversation vs. memorized, proper volume, distinct pronunciation, timing of discussion matches presentation, was the amount of time divided fairly evenly among presenters)	5		
	Body Language (good eye contact with audience, no distracting mannerisms, good motion)	5		
	Visual aides (slides were clear, free of clutter, effective, appropriate, related to discussion items)	10		
<b>Discussion (10 Points)</b>	Questions & Answers (clear delineation of expertise, answers reflect true knowledge, how were the questions handled, was everyone able to answer questions or was it just one person)	10		

**Total Presentation Score (100 Points): \_\_\_\_\_**