



**WEF® STUDENT
DESIGN COMPETITION
ENTRY GUIDELINES**

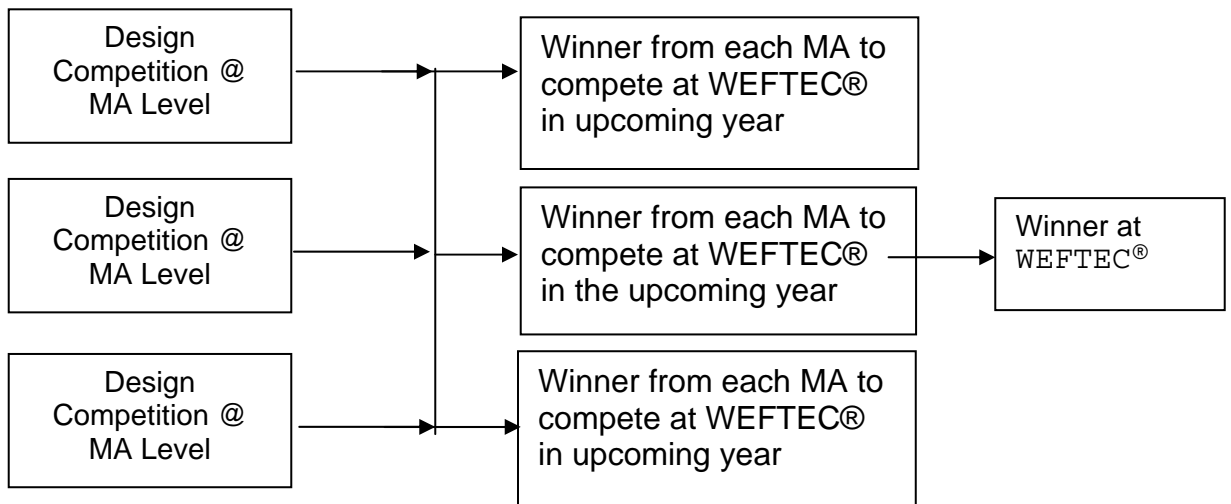
INTRODUCTION

The WEF® Student Design Competition is intended to promote “real world” design experience for students interested in pursuing an education and/or career in water/wastewater engineering and sciences. This competition tasks individuals or teams of students within a WEF® student chapter to design and present a program meeting the requirements of the problem statement. **Please contact Leslie Samel, Sub-Committee chair for the WEF Student Design Competition** at (704) 342-4546 or Email samells@cdm.com with any questions regarding the competition guidelines. The WEF® Students & Young Professionals Committee (SYPC) is always looking for interested persons to help further the activities supported by the committees. If you are interested in helping or becoming a member please contact, Leslie Samel, or Dianne Crilley, WEF® staff liaison to the SYPC at (703) 684-2445 or Email DCrilley@wef.org.

BACKGROUND

The student design competition concept was based off a student competition held within the Florida WEA. Each year FWEA student chapters receive the same design problem statement and information and are asked to present their solution at the annual conference. The competition is highly promoted throughout the member association and is usually well funded through FWEA, consulting firms, municipalities, and/or private corporations. Students are given one semester to finish their design. At the annual FWRC conference, the teams present and are judged to determine a winner.

WEF® and the WEF® SYPC feel this competition promotes interest within students that will prove to be extremely valuable. A WEF® Student Design Competition Task Force was formed to lead the effort in establishing a WEF® Student Design Competition to be held annually at WEFTEC®. It is of the intent of the WEF® Student Design Competition Task Force to promote this competition at the MA level as well as nationally. These guidelines represent a general guide to what the task force envisions, however, we realize that not every MA or student group will be able to follow these initially. Below is a schematic of the *intent* of this competition.



Each MA will choose a design problem and distribute to schools willing to participate. If more than one school participates in each MA, a WEA Student Design Competition will be held at the MA level. The winner of this MA competition would be invited to compete at WEFTEC® in the coming year. If only one school is willing to participate within the MA, that team may compete at WEFTEC® assuming they meet the guidelines set for herein. Furthermore, it is at the discretion of each MA to adopt and/or change rules of these guidelines needed in order to have a successful competition.

WEF® STUDENT DESIGN COMPETITION

The student design competition can be based around problems such as sewer design (collection & distribution system analysis), wastewater treatment plant expansions, biological nutrient removal, reuse, and/or constructed wetlands, etc. The scope and extent of the project should be at the level of senior or graduate engineering/science student in a design or capstone course. Students are expected to work with little assistance from an advisor and/or professor, and the students are expected to work together as a team to find a solution to their problem. Students may use whatever references or resources they choose.

Students are expected to perform the necessary calculations for their particular project. This is not intended to be a research project or literature review. 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 should look that each 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.)

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

Timeline:

Experience and conversations with students who have participated in this type of competition in the past indicated the need for the problem statement to be given approximately 3 to 4 months prior to the competition. A sample timeline is shown below to give relative timeframes that would be ideal for the competition to be successfully completed on the MA level. It should be noted that the dates are given only as a guideline and may be adjusted to suit each student chapter participating.

- MA's coordinate with consulting firms/industry and the MA's Student Activities Committee to develop a problem statement and assemble design competition packets. (November)
- MA's distribute the problem statement to interested student chapters. This would start the beginning of the competition. (January)
- MA level competition held. (April)
- The winner from each MA to compete nationally at WEFTEC®. (September/October)

REQUIREMENTS OF THE COMPETITION

1. **TO BE ELIGIBLE**, each presenter must be a student member who:

- **is** currently a full-time student, and
- **has** been selected by his/her student chapter to participate, and
- **has** been certified by the individual member association as a student member in good standing.

To be thus certified, a new student member must have filed an application and paid the required dues before the first day of the month prior to the designated competition. The same holds true for continuing student members.

****The task force realized that initially schools willing to participate may not have a WEF® Student Chapter and/or the students may or may not be WEF® student members. Therefore, initially as long as the participants are full-time students they will be allowed to participate.**

2. Teams may consist of more than four members, but only four student members may present. Student members who have graduated or are not a full-time student at the time of the WEFTEC will be allowed to participate. **IN NO CASE MAY THERE BE MORE THAN ONE ENTRY FROM ANY ONE STUDENT CHAPTER.**
3. Student members will compete through oral presentations. Each presentation will be 20 minutes followed by a 10-minute question and answer period. The presentation should be in PowerPoint format. Any time remaining or in excess of the 20 minutes may be added to or subtracted from the 10-minute discussion period. Questioning is limited to the judging panel during the question and answer period.
4. A design notebook complying with the requirements set forth in this document must accompany each entry.

NATURE AND MANNER OF PRESENTATION

It is recognized that environmental professionals must possess a well-developed ability to communicate both orally and in writing. The competition is designed to emphasize the value of the ability to deliver oral presentations. A major portion of a contestant's total score is determined through an evaluation by the judges of the competitor's relative capability to communicate orally, including evidence of a talent to respond effectively to question and answer period. (A scoring sheet is enclosed as part of the packet to each student chapter.) Subject matter must be related to the field of environmental engineering and a project notebook is required.

CONDUCT OF THE CONTEST

The same individuals will judge throughout the contest. Ideally, the judging panel should be comprised of the each MA's Board of Directors and/or members of the sponsoring company/industry. In order to assure fairness of competition, each competing student chapter may not watch another student chapter's presentation until they have given their

presentation. Although this is a disadvantage to the last student chapter presenting, it will maintain fairness throughout the competition. Students presenting at WEFTEC® will be allowed to view the other presentations. The scoring sheet has been developed for the convenience of the judges in evaluating the presentations in competition and will be used by the judges as the basis for judging all the student chapters (see scoring sheet).

PRIZES

The following are possible prizes that can be awarded by the MA:

PRIZE	AWARD
First	Traveling Trophy Money for to attend WEFTEC® Scholarships Free WEF student memberships
Second	Money/Scholarship Free WEF® student memberships

It should be noted that these are just ideas for prizes. However, serious consideration should be made for travel expenses to attend WEFTEC®. Every opportunity should be made by the MA to assist the student chapter in competing at WEFTEC®. Similarly, each MA might seek out sponsorships from local industries, municipalities, and consulting firms in order to help the winner attend WEFTEC®.

Prizes for the winner at WEFTEC® will vary depending on sponsorship opportunities. Monetary awards for the top 4 Design Teams are: 1st place \$2,500, 2nd place \$1,000, 3rd place \$750, and 4th place \$500.

NOTEBOOK REQUIREMENTS

A vinyl, non-flexible, single volume, 1-inch three-ring binder shall be used to compile documents that describe the entry for judging. An original and five copies of the notebook (a total of six) must be submitted.

***The number of notebooks is left to the discretion of each MA. Students participating nationally at WEFTEC® will only be required to submit one design notebook. Ideally there should be a notebook for every two judges to share.*

The project name, entrant's name and the words "original" or "copy", as appropriate, shall be affixed to the spleen and front of the notebooks.

The notebook and each copy shall include, in the following order:

1. **Entry Form** - Please use the original entry form supplied to you for the "original" notebook.
2. **Project Description** - A description of the project or program, not to exceed 1,000 words, giving the following information:
 - the entrant's role in the effort

- the names of any others that assisted in the effort
- a description of the entry, which addresses each of the judging criteria.

***The number of words used in the description is checked to ensure compliance with the 1,000-word limit. Each word or grouped-together symbols, abbreviations, etc., are counted as one word.**

3. **Supporting Documentation** - Drawings, calculations, tables, and other voluminous documents.
4. **References**

ENTRY FEE

There is no entry fee for the competition.

JUDGING CRITERIA

Each MA is a multi-disciplined environmental engineering organization dedicated to quality in practice of the profession. Accordingly, judging will be based on the four elements outlined below.

1. **Content**. To what extent was subject of interest to a technical audience? Was credit given for source of material or contribution by others? How much knowledge of subject was exhibited? Was work independent and original? Was subject technical or general in nature?
2. **Organization**. Was there any novel approach to the subject? Was there sufficient background information provided in order 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?
3. **Delivery and Effectiveness**. Were the words distinctly pronounced and was proper volume used to be heard by all? Did the contestant 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 completed within the time limit of 20 minutes?
4. **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?

Below is a sample information packet that would be given to each student chapter wishing to compete at the MA level. This is an actual problem description and packet given to a student chapter competing at the MA level. Note this is only given as a general idea of sample project description and information. This packet would vary with the amount of information provided and contact names. A copy of the Student Design Guidelines should also be included.

DESCRIPTION OF PROJECT

This year's design project is a three-part project and includes the preliminary design of a sewer collection system, a wastewater treatment plant expansion, and a reuse irrigation distribution system for a large development in Jupiter, FL known as Abacoa. A contact at the WWTP should be provided if possible so that teams may arrange tours of the plant as part of the project.

Part 1 – Sewer Collection

Based on Abacoa's community master plan, design the back-bone sewer infrastructure that will collect sewage from the community and transport the sewage to the treatment plant location.

Part 2 – Sewage Treatment

As a result of the growing community, the Loxahatchee River District's (LRD) Regional Wastewater Treatment Plant (WWTP) will need to be expanded. With reuse being a favorable method of effluent disposal, LRD desires the expansion to contain nitrogen reduction processes that would drive the nitrogen under the existing ground water standards of 10 ppm.

Part 3 – Reuse Irrigation

Based on the community's irrigation needs, design a reuse irrigation system and backbone distribution system that will provide irrigation-quality water from the WWTP to the development.

The following documents are attached to assist in the preparation of the recommended program developed by the student chapters:

- Exhibit A - Development master plan of Abacoa
- Exhibit B - Map of Jupiter
- Exhibit C - Loxahatchee River District Wastewater Treatment Plant Drawings
- Exhibit D - WWTP Monthly Operating Report (MOR)
- Exhibit E - WWTP Capacity Analysis Report
- Exhibit F - Abacoa Irrigation Master Plan
- Exhibit G - Scoring Sheet for Student Design Competition
- Exhibit H - Entry Form

ENTRY FORM

2004 STUDENT DESIGN COMPETITION

(Name of Member Association)



Name of University: _____

Address: _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____

Name of Individual to Contact: _____

Address (if different): _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ E Mail: _____

Name of Faculty Advisor: _____

Address (if different): _____

City: _____ State: _____ Zip: _____

Phone: _____ Fax: _____ E Mail: _____



Title of Presentation: _____

Name(s) of Presenters: _____

Special requests or equipment needed for the presentation:

SCORING SHEET FOR THE 2004 STUDENT DESIGN COMPETITION

Name of University _____

Number of Presentation _____

Name(s) of Presenters _____

Title of Presentation _____

CONTENT

SCORE

Subject Matter: General, Technical

 0 5 10

Personal Contribution: Library Research,
 Independent, Innovative Project

 0 5 10

Knowledge of Subject: Limited, Complete

 0 5 10

ORGANIZATION

Introduction: Background (eliciting
 audience interest), Objectives,
 Outline of Presentation

 0 5 10

Continuity: Essential Facts Developed
 in Logical Sequence

 0 5 10

Conclusion: Definite and Based on Facts

 0 5 10

DELIVERY AND EFFECTIVENESS

Vocal Delivery: Conversation vs.
 Memorized, Proper Volume,
 Distinct Pronunciation, Timing

 0 5 10

Body Language: Eye Contact with
 Audience, Distracting Mannerisms

 0 5 10

Visual Aids: Legibility, Effectiveness

 0 5 10

DISCUSSION

Questions and Answers:
 Clarification, Spontaneous

 0 5 10

TOTAL SCORE _____