

MULTIDISCIPLINARY DESIGN FORMATS: BASIC DIMENSIONS

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Abstract--- The US national ABET/EC2000 engineering accreditation challenge to present all undergraduate engineering students with a multidisciplinary team experience. This task may be met through multidisciplinary design, but only when the institution involved is able to create cost-effective, assessable, and scalable formats for such design collaborations. We present the notion of a “basis set” or menu of elective choices for each of 11 dimensions. This set produces all of our own developments in MD collaborations, and has sufficient flexibility in format that any proposer can utilize the local institutional resources and local schools state ABET/EC2000 mission to maximum advantage. Key dimensions in the basis set are the source of the design challenge, the source of the project or course funding, the course format, the presence/absence of vertical integration of students, and the involvement of industry know-how through either company grants or professional society collaborations. Engineering administration concerns in these examples include scalability (access for many or all engineering students) and the costs of institutionalization. Additionally, we discuss college wide approaches to “curricular transparency”.

Index Terms---design, multidisciplinary, capstone, ABET/EC2000

The NSF/SUCCEED Coalition

The eight campus, NSF-funded Southeastern University and College Coalition for Engineering Education (SUCCEED) includes Clemson University, Florida State/FAMU, Georgia Tech, North Carolina A & T University, North Carolina State University, the University of Florida, University of North Carolina-Charlotte, and Virginia Tech. Among the many activities developed over 10 years of funding has been the emergence of a variety of proven approaches to creating and institutionalizing multidisciplinary design experiences on each of these eight campuses.

These results have been received throughout the US engineering community through over 25 faculty development workshops and seminars at non-SUCCEED schools and professional society meetings (ASEE, FIE), with another 30 scheduled for presentation in 2002-2003.

Formats for Multidisciplinary Design

We deduce from the character of nine distinct formats developed within SUCCEED schools that a total of eleven choices may be made to recreate any one of the nine, and of others developed since the original formats were funded. By elective choice in each category, unique project and course experiences may be created which nonetheless satisfy the common features of

design courses . This collection we propose as a basis set for creation of new collaborations in design, within engineering, or between engineering and other colleges, and even other campuses.

Course or Project dimensions: choices 1-7

1. Source of design idea: industry(funded projects), professional society(non-funded project), faculty, or student
2. Level of multidisciplinary collaboration: students (required), faculty, department, colleges, institutions
3. Vertical integration: none(seniors only), undergrads, undergrads and grads
4. Funding: industry, college, department, research group
5. Design course level: capstone (most common), first year, other
6. Student team size: 3 to 20
7. Academic formats: 1 semester (design), 2 semesters (design/build/test), summer

Institutional dimensions: choices 8-9

8. College commitments and assistance: curricular transparency, project fundraiser/solicitor
9. Multipliers of faculty time through collaboration: grad student, inter-departmental faculty, personnel from professional societies or industry.

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