



American Institute of
Aeronautics and Astronautics

AIAA PROFESSIONAL DEVELOPMENT • COURSE PROFILE FORM •

Please note that the information asked for in this document is extremely important for us to evaluate your proposal and promote your course, should it be accepted. Please be as complete as possible. Feel free to attach additional sheets as necessary. If you have any questions, please contact Patricia A. Carr at 703/264-7523 or triciac@aiaa.org.

1) Course Title & Duration

A. Title of Course: **Grid Generation**

B. Type of Course: (circle) **Short Course (classroom)**
Home Study Course
Virtual Seminar
Online Course

C. Preferred Course Length: 0.5 day(s)/months

D. Is an AIAA Technical Committee sponsoring this Course? (circle) **Yes** No
If so, which technical committee? **Meshing, Visualization & Computational Environments**

E. At which AIAA technical conference(s) should this course be held in conjunction with or is it best as a stand-alone course? **CFD 2007 (June)**

2) Instructor(s) Information

Please provide information for all instructors. Identify the Lead Instructor or Point of Contact. If there are multiple instructors for this course, AIAA will communicate with the Lead Instructor and that person will disseminate relevant information to the other instructors.

A. Lead Instructor/Point of Contact:

Name ____ **Dr. John F. Dannenhoffer, III**
Address ____ **Syracuse University**
Address ____ **157 Link Hall**
City ____ **Syracuse** _____ State ____ **New York** ____ Zip ____ **13244** ____
Telephone ____ **315-443-3340** _____ Fax ____ **315-443-9099** _____
Email address ____ **jfdannen@syr.edu** _____

In a narrative/paragraph form, please provide a 50-word biography on each instructor. Also please send a complete resume.

Prof. Dannenhoffer is an Associate Professor of Aerospace and Mechanical Engineering at Syracuse University. He has been active in the grid generation and geometry area for 25 years and has authored numerous articles and papers on the subject.

B. Other Instructors:

Selected from the following list: (based upon availability)

William T. Jones
* **NASA Langley Research Center**

Steven Karman
* **UT SimCenter at Chattanooga**

Todd Michal
* **Boeing**

John Steinbrenner
* **Pointwise, Inc.**

Ralph Noack
* **U.S. Army Research Lab**

Peter Civallo
* **Craft-Tech**

3) Product Description

A. In narrative form, please provide brief symposia of this course (150 words or less).

This tutorial will enable the participants to understand the geometry and grid generation processes at a very high level, with specific emphasis given to the various approaches available today. Through a discussion of the strengths and weaknesses of the approaches, the participants will be able to determine which approach is most appropriate for their applications. Furthermore, this tutorial will provide the participants with enough understanding of the process so that they can assess and potentially improve the grid generation process in their own organization. This tutorial is not intended for practitioners who need detailed knowledge in order to actually apply a new technique.

B. In bullet format, please provide key topics of the course (no more than 6 bullets).

- * **Grid generation basics**
- * **Geometry definition**
- * **Grid techniques: block-structured, Cartesian, unstructured, hybrid, overset**
- * **Grid adaptation**
- * **Future directions**
- * **10 questions to ask your grid generator**

C. In bullet format, please provide a complete outline including subheadings (no more than 30 lines).

- * **Grid generation process**
 - overview of grid generation process
 - rogue's gallery of different grid types
- * **Geometry definition**
 - direct interfaces to CAD systems
 - file-based geometry definitions
 - parametric systems
- * **Block-structured grids**
 - brief history, basic strategy, examples, guideline for use
- * **Cartesian grids**
 - brief history, basic strategy, examples, guideline for use
- * **Unstructured grids**
 - brief history, basic strategy, examples, guideline for use
- * **Hybrid grids**
 - brief history, basic strategy, examples, guideline for use
- * **Overset grids**
 - brief history, basic strategy, examples, guideline for use
- * **Grid adaptation**
 - brief history, basic strategy, examples, guideline for use

*** Future directions**

- **current unmet needs**
- **expected future needs**
- **promising technologies to watch**
- **summary of strengths and weaknesses of various approaches**
- **why grid generation is not a mature topic**
- **catalog of websites devoted to grid generation**

*** 10 questions you should ask your grid generator**

Note: please adhere to the word or bullet limit. If it exceeds the limit, it is to our discretion to edit.

4) Product Market

A. In narrative form, give a brief paragraph on who should attend this course (50 words or less)

Note: please adhere to the word or bullet limit. If it exceeds the limit, it is to our discretion to edit.

This course is intended for all engineers and managers who use CFD. It focusses on determining which grid generation approach is most appropriate for a given application, highlights the associated pitfalls, and provides guidelines that can be used to determine if the quality of the grid generation process.

B. Which Professional Interests apply to your Course?

- Indicate the Primary Professional Interest Market: (enter code) **0730**
- Indicate the Secondary Professional Interest Market: **0280**
- Indicate the Tertiary Professional Interest Market **0235**

Please also circle all other professional interest codes that apply.

**ENGINEERING & TECHNOLOGY
MANAGEMENT**

- (0100) Economics
- (0105) History
- (0110) Legal Aspects of Aeronautics and Astronautics
- (0115) Management
- (0120) Society & Aerospace Technology
- (0125) Technical Information Services
- (0130) Systems Engineering

- (0135) Environmental Assurance/Compliance

AEROSPACE SCIENCES

- (0200) Aeroacoustics
- (0205) Aerodynamic Decelerator Systems
- (0210) Applied Aerodynamics
- (0215) Astrodynamics
- (0220) Atmospheric Environment
- (0225) Atmospheric Flight Mechanics

- (0235) Fluid Dynamics
- (0240) Guidance, Navigation & Control
- (0245) Aerodynamic Measurement Technology
- (0250) Plasmadynamics & Lasers
- (0255) Sounding Rockets
- (0265) Thermophysics
- (0270) Remote Sensing & Applications
- (0280) Computational Fluid Dynamics

AIRCRAFT & AIR TRANSPORTATION SYSTEMS & OPERATIONS

- (0300) Air Transportation Systems
- (0305) Aircraft Design
- (0310) Aircraft Operations
- (0315) Aircraft Safety
- (0316) Balloon Technology
- (0320) General Aviation Systems
- (0325) Helicopter Design
- (0330) Lighter-Than-Air Systems
- (0335) Remotely Piloted & Unmanned Air Vehicles
- (0340) V/STOL Aircraft Systems
- (0345) Marine Systems & Technology
- (0350) Multidisciplinary Design Optimization
- (0355) Hypersonic Systems
- (0360) Flight Testing
- (0365) Electronic Equipment Design
- (0370) Ground Support Equipment
- (0375) Aircraft Maintenance
- (0380) Reliability
- (0385) Test & Evaluation
- (0390) Standards Engineering
- (0395) Producibility & Cost Engineering
- (0396) Production Engineering

INFORMATION SYSTEMS

- (0400) Aerospace Electronics
- (0405) Aerospace Maintenance
- (0410) Intelligent Systems
- (0420) Information & Command & Control Systems
- (0425) Communications Systems
- (0430) Computer Systems
- (0435) Digital Avionics Systems
- (0440) Sensor Systems
- (0445) Software Systems

- (0450) Support Systems
- (0455) System Effectiveness & Safety
- (0460) Space Logistics
- (0465) Micro/Nanotechnology

PROPULSION & ENERGY

- (0500) Aerospace Power Systems
- (0505) Air Breathing Propulsion
- (0510) Electric Propulsion
- (0515) Liquid Propulsion
- (0520) Propellants and Combustion
- (0525) Solid Rockets
- (0530) Terrestrial Energy Systems
- (0535) Nuclear Thermal Propulsion
- (0540) Hybrid Rockets
- (0545) Energetic Components & Systems

SPACE & MISSILE

- (0600) Life Sciences & Systems
- (0605) Missiles Systems
- (0610) Space Operations & Support
- (0615) Microgravity & Space Processes
- (0620) Space Systems
- (0625) Space Transportation
- (0630) Space Sciences & Astronomy
- (0635) Space Automation & Robotics
- (0640) Weapon Systems Effectiveness
- (0645) Human Factors Engineering
- (0650) Satellite Design, Integration & Test
- (0655) Launch Operations
- (0660) Laser Technology
- (0665) Space Tethers
- (0670) Space Colonization
- (0675) Space Tourism
- (0680) Terraforming

STRUCTURES, DESIGN & TEST

- (0700) Computer-Aided Enterprise Solutions
- (0701) Survivability
- (0705) Design Engineering
- (0710) Design Technology
- (0715) Modeling & Simulation
- (0725) Ground Testing
- (0730) Meshing, Visualization & Computational Environments
- (0735) Materials
- (0745) Structural Dynamics

(0750) Structures
 (0755) Adaptive/Smart Structures
 (0760) Radar Absorbing Materials &
 Structures

(0765) Gossamer Spacecraft

C. Which Company Codes apply to your Course?

- Indicate the Primary Business Code: **1 (all)**
- Indicate the Secondary Business Code: **2A**
- Indicate the Tertiary Business Code: **4B**

Please also circle all other company codes that apply.

**AEROSPACE
 MANUFACTURING**

- (1A) Military Aircraft
- (1B) Commercial Aircraft
- (1C) Business & Private
Aircraft
- (1D) Helicopters
- (1E) Missiles
- (1F) Spacecraft
- (1G) Powerplant &
Propulsion Systems
- (1H) Avionic/Electronic
Component &
Subsystems
- (1I) Electro/Mechanical
Systems
- (1J) Hydraulic /Pneumatic
Systems
- (1K) Flight Controls &
Instrumentation
- (1L) Other

Parts/Components
& Subsystems

GOVERNMENT

- (2A) Department of
Defense
- (2A1) US Army
- (2A2) US Air Force
- (2A3) US Navy
- (2A4) US Marine Corps
- (2B) NASA
- (2C) Other Federal, State &
Local
- (2D) Non-US Government
- (2D1) Non-US Military

AIR

- TRANSPORTATION**
- (3A) Trunk, Regional &
International
- (3B) Business & General

Aviation

SUPPLIERS

- (4A) Materials
- (4B) Engineering or
Manufacturing
Equipment
- (4B1) Computers
- (4B2) Software

SERVICES

- (5A) Consulting or
Government Service
Contracting
- (5B) Science, Research &
Developing, or
Contracting
- (5C) Education
- (6) Others Allied to this
Field

C. What other technical societies, companies, government agencies, conferences attendee lists, requests for reprints, departmental or company mailing lists, etc. would likely find your course relevant to their members'/companies' areas of interest. (please list)

Meshing Roundtable (Sandia)
International Society of Grid Generation (ISGG)

D. Can you provide mailing lists?

Will try

- E. List any other courses being offered that, to your knowledge, are similar to this course or that you think may compete with the course. (List their titles, and instructors.)

none

5) Product Development

What is the likely development process and expected life cycle of this course? Is this course time sensitive? Please provide a brief summary of the life cycle and trend of this topic.

Course could be ready in 9 months, probably should be offered every 2 years since there is constant turn-over of possible participants

6) Course Requirements

- A. Is there a textbook required with your course? If so, provide author, title list price and publisher as well as any purchase discounts that AIAA could obtain in conjunction with this course.

Authors will provide needed notes

- B. Are there any computer requirements for this course? If so, please give full information. Have you designed any software programs to accompany your course? If so, please describe as fully as possible.

Only computer-based projection

- C. Are there any other requirements, other than course notes, that students will need to complete the course?

none

7) Testimonials

We use testimonials, or endorsements, from qualified, eminent individuals for promotional use. These endorsements are solicited by you, and are important to attract potential students. Please provide us with their names, titles, business affiliations, addresses, and telephone numbers.

8) Originality & ITAR Compliant

It is essential that we know if this proposal is being considered by another organization or if this course, or any part of this course, has been previously held? Please sign the following statements so that we are in no doubt as to the originality of this work.

A. CLEARANCE

The accompanying notes/handouts, books, and/or lecture are UNCLASSIFIED (for public release) and have been cleared for release by the appropriate agencies, company, or government. The course materials have been determined to be in the public domain as defined in the International Traffic in Arms Regulation.

Signature of Lead Instructor

Date

B. NO-INFRINGEMENT STATEMENT

Copyright laws recently have received fresh emphasis here and abroad. Please make unambiguous the copyright status of any published material, course notes, or handouts, by signing the following affidavit assuring us that it contains no copyright-infringing material:

The published material, course notes, or handouts represent original work by the author/s. No portion of the material is covered by a prior copyright or for any portion that may be copyrighted, the author has obtained permission for its use.

Signature of Lead Instructor

Date