

Undergraduate Education

Science • Mathematics • Engineering • Technology

Program Announcement and Guidelines

Directorate for Education and Human Resources (EHR)
Division of Undergraduate Education (DUE)

- COURSE, CURRICULUM, AND LABORATORY IMPROVEMENT
 - NSF COLLABORATIVES FOR EXCELLENCE IN TEACHER PREPARATION
 - ADVANCED TECHNOLOGICAL EDUCATION
-



NATIONAL SCIENCE FOUNDATION
NSF 99-53

DIVISION OF UNDERGRADUATE EDUCATION (DUE)

Program Deadlines*

Course, Curriculum, and Laboratory Improvement (CCLI)

Contact: (703) 306-1681

Formal proposals

June 7, 1999

(Annual June deadlines are anticipated.)

NSF Collaboratives for Excellence in Teacher Preparation (CETP)

Contact: (703) 306-1669

Preliminary proposals

May 1, 1999

Formal proposals

September 1, 1999

(Annual deadlines are anticipated for the CETP Institutional Focus track, and biennial deadlines for the CETP System-wide Focus track.)

Advanced Technological Education (ATE)

Contact: (703) 306-1668

Preliminary proposals

April 14, 1999

Formal proposals

October 14, 1999

* For paper submission of proposals, the required materials must be *postmarked* no later than the program deadline date. For electronic submission of formal proposals (via the NSF FastLane system), the proposal must be submitted by 5:00 p.m. local time on the program deadline date.

Information and Inquiries

DUE Web site:

<http://www.ehr.nsf.gov/EHR/DUE/start.htm>

DUE Project Information Resource System (PIRS):

<http://www.ehr.nsf.gov/PIRstart/>

A new and evolving searchable database of information supplied by Principal Investigators about DUE-supported projects

NSF Web site:

<http://www.nsf.gov/>

Online Document System:

<http://www.nsf.gov/cgi-bin/pubsys/browser/odbrowse.pl>

Awards Search:

<http://www.nsf.gov/verity/srchawd.htm>

DUE Information Center:

E-mail:

undergrad@nsf.gov

Phone:

(703) 306-1666

NSF TDD (for the hearing impaired): (703) 306-0090

DUE mailing address:

National Science Foundation
Division of Undergraduate Education
4201 Wilson Blvd., Room 835
Arlington, VA 22230

NSF publications are available electronically via the Online Document System (see URL above). Printed publications may be ordered by telephone (301) 947-2722 or by e-mail at pubs@nsf.gov; please include the NSF publication number and title, number of copies, and your complete mailing address.

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Glossary of Acronyms

Acronym	Definition
ATE	Advanced Technological Education
ATE-CE	ATE Centers
ATE-PR	ATE Projects
CCLI	Course, Curriculum, and Laboratory Improvement
CCLI-A&I	CCLI Adaptation and Implementation
CCLI-EMD	CCLI Educational Materials Development
CCLI-ND	CCLI National Dissemination
CETP	NSF Collaboratives for Excellence in Teacher Preparation
CETP-IF	CETP Institutional Focus
CETP-SF	CETP System-wide Focus
DUE	Division of Undergraduate Education
EHR	Directorate for Education and Human Resources
ESIE	Division of Elementary, Secondary, and Informal Education
GPG	Grant Proposal Guide (NSF 99-2)
KDI	Knowledge and Distributed Intelligence
NVC	National Visiting Committee
PFK	Proposal Forms Kit (NSF 99-3)
PI	Principal Investigator
SMET	Science, Mathematics, Engineering, and Technology

NSF FastLane System

<http://www.fastlane.nsf.gov>

The NSF FastLane system provides a Web-based interface for proposal preparation, submission, status check, project reporting, and post-award administrative activities. Access to proposal and post-award functions is limited to staff from FastLane-registered organizations and is secured through the use of Personal Identification Numbers (PINs). A list of registered organizations and the FastLane registration form can be found by visiting the FastLane home page at the URL above.

Information for Principal Investigators (PIs) intending to submit a proposal via FastLane:

- Contact your Sponsored Research Office (SRO) or equivalent business office for assignment of a PIN to gain access to FastLane functions. If you have not submitted a proposal to NSF in the past, you must contact your SRO to be added to the NSF PI database.
- In order to use FastLane to prepare and submit a proposal, the following are required:
 - Web Browser (must support multiple buttons and file upload):
 - Netscape 3.0+
 - Microsoft Internet Explorer 4.01+
 - PDF Reader (needed to view/print forms):
 - Adobe Reader 3.0+
 - PDF Generator (needed to create Project Description):
 - Adobe Acrobat 3.01+
 - Aladdin Ghostscript 5.10+
- When using FastLane to prepare a proposal, enter your information early, as users occasionally experience delays in the FastLane system as program deadlines approach.
- **FastLane submission of formal proposals must occur by 5:00 p.m. in the PI's local time zone on the relevant deadline date.**

For detailed information about FastLane, visit the FastLane home page at the URL above.

Use of FastLane for DUE Programs

Function	Required ¹	Encouraged
Preparation and submission of formal proposals ² for:		
CCLI Educational Materials Development.....		√
CCLI Adaptation & Implementation.....		√
CCLI National Dissemination.....	√	
CETP Institutional Focus.....		√
CETP System-wide Focus.....	√	
ATE Projects.....		√
ATE Centers.....	√	
For all formal proposals, submission of:		
Cover Sheets.....		√
DUE's Project Data Form (Form 1295).....		√
Submission of:		
Annual and Final Project Reports ³	√	
No-Cost Extension Notifications or Requests.....	√	
Check status of proposals:.....		√
Notes:		
1. Waivers may be granted by the Division Director only under unusual circumstances.		
2. No preliminary proposals should be submitted via FastLane.		
3. Submit report via the Project Reporting System in FastLane; send any attachments separately.		

NSF Organization

The Division of Undergraduate Education (DUE) is the focal point for NSF's agency-wide effort to strengthen and ensure the vitality of undergraduate education in science, mathematics, engineering, and technology for all students.

NSF Directorates

EHR Divisions

DUE Programs

Biological Sciences (BIO) Computer and Information Science and Engineering (CISE) Education and Human Resources (EHR) Engineering (ENG) Geosciences (GEO) Mathematical and Physical Sciences (MPS) Office of Polar Programs (OPP) Social, Behavioral and Economic Sciences (SBE)	Educational System Reform (ESR) Elementary, Secondary, and Informal Education (ESIE) Experimental Program to Stimulate Competitive Research (EPSCoR) Graduate Education (DGE) Human Resource Development (HRD) Research, Evaluation, and Communication (REC) Undergraduate Education (DUE)	 Course, Curriculum, and Laboratory Improvement (CCLI) NSF Collaboratives for Excellence in Teacher Preparation (CETP) Advanced Technological Education (ATE)
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Other Sources of NSF Support for Undergraduate Education*

- EHR/HRD Alliances for Minority Participation (AMP) (NSF 98-19)
- EHR/HRD Activities in Science, Engineering, and Mathematics for Persons with Disabilities (NSF 98-144)
- EHR/HRD Program for Gender Equity in Science, Mathematics, Engineering, and Technology (NSF 99-25)
- EHR/REC Research on Education, Policy, and Practice (REPP) (NSF 96-138)
- CISE/EIA Educational Innovation Program (NSF 98-44)
- CISE/EIA Minority Institutions Infrastructure Program (NSF 96-15)
- ENG & CISE Combined Research-Curriculum Development (CRCD) (NSF 98-38)
- ENG/EEC The Action Agenda for Systemic Engineering Education Reform (NSF 98-27)
- GEO Geoscience Education (NSF 99-44)
- MPS/DMS Vertical Integration of Research and Education in Mathematical Sciences (VIGRE) (NSF 97-155)
- NSF-wide Research Experiences for Undergraduates (REU) (NSF 96-102)

* Programs and publication numbers are subject to change. Check NSF's Web site <<http://www.nsf.gov/>> for the latest information.

Introduction

The National Science Foundation (NSF) provides leadership and support for the Nation's efforts to improve education in science, mathematics, engineering, and technology (SMET), addressing every level of education. Although almost all units of the Foundation are engaged in these activities, primary responsibility is concentrated in the Directorate for Education and Human Resources (EHR).

Undergraduate education is central to NSF's mission in human resource development. Whether preparing students to participate as citizens in a technological society, to enter the workforce with two- or four-year degrees, to continue their formal education in graduate school, or to further their education in response to new career goals or workplace expectations, undergraduate education provides the critical link between the Nation's secondary schools and a society increasingly dependent upon science and technology.

The EHR Division of Undergraduate Education (DUE) serves as the focal point for NSF's agency-wide effort in undergraduate education. DUE programs address the spectrum of undergraduate educational challenges. Programs include:

- Course, Curriculum, and Laboratory Improvement (CCLI)
- NSF Collaboratives for Excellence in Teacher Preparation (CETP)
- Advanced Technological Education (ATE)

This announcement describes these programs. Updates may be issued, as needed, to announce relevant changes or additions. To stay current with the DUE program offerings, periodically visit the DUE Web site <<http://www.ehr.nsf.gov/EHR/DUE/start.htm>>. All NSF publications referenced in this document are available via the NSF Online Document System (see inside front cover for details).

RATIONALE FOR DUE PROGRAMS

DUE's programs and leadership efforts reflect the recommendations made in *Shaping the Future: New Expectations for Undergraduate Education in Science, Mathematics, Engineering, and Technology* (NSF 96-139). The report and follow-on activities have had broad-based input involving faculty from SMET disciplines, academic institution presidents and other administrators, representatives from business and industry, students, and parents. The results of these activities highlight the importance of undergraduate SMET education for all students, including:

- SMET majors
- prospective pre-Kindergarten through grade 12 (preK-12) teachers
- students preparing for the technical workplace
- all students, as citizens in a technological society.

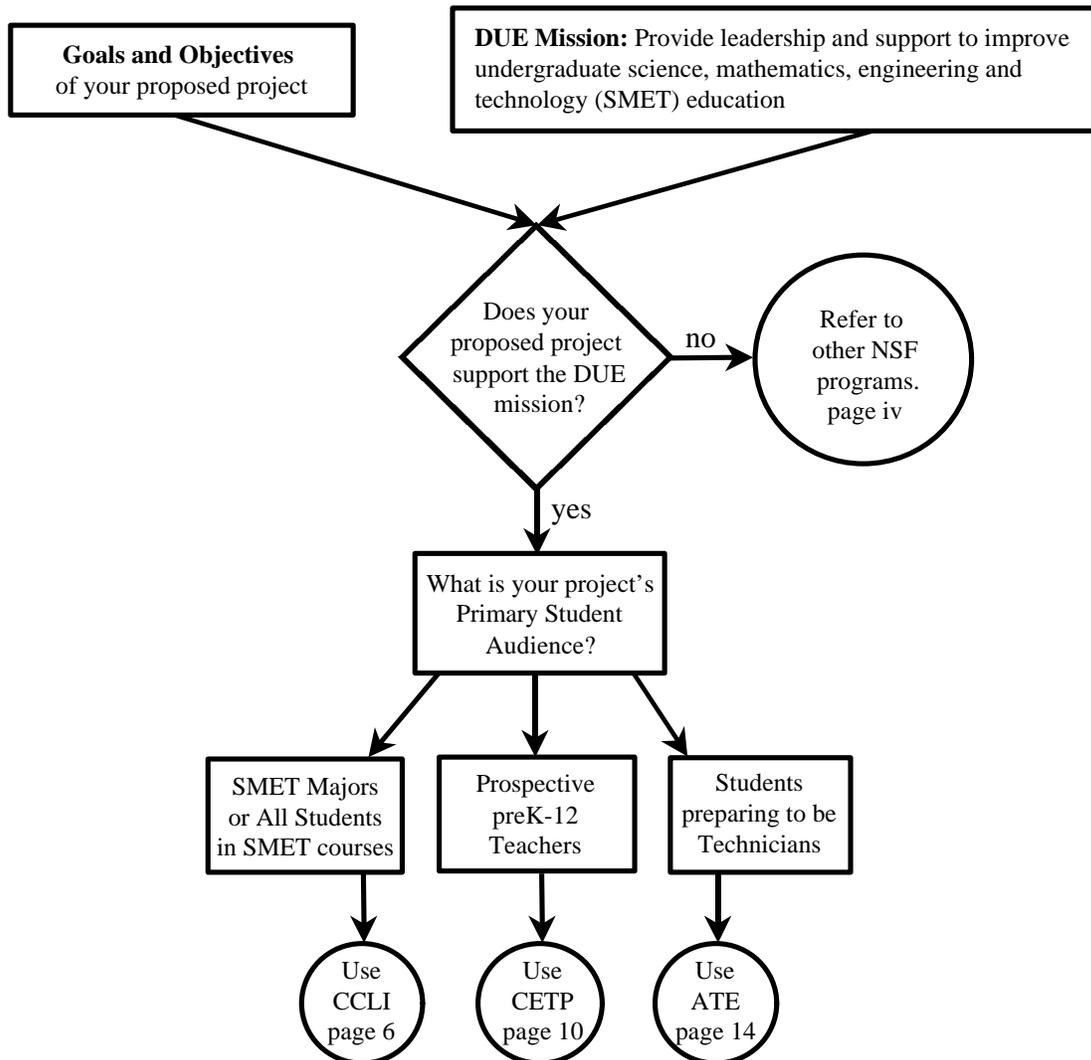
Attention to all students reflects the need to develop further components of our nation's diverse population that are underrepresented in the SMET enterprise. The percentages of underrepresented minorities*, persons with disabilities, and women that follow careers in SMET fields need to increase if this nation is to realize its full potential. The "non-traditional" student (e.g., part-time student, working parent, career-changing adult) is also an important constituent of the *Shaping the Future* vision.

High quality undergraduate SMET education for all students calls for more effective linkages between preK-12 schools and higher education, between two- and four-year institutions, between undergraduate and graduate education, and between higher education and business/industry to better prepare students for entry and growth in the technological workplace. Faculty members who creatively combine teaching with research are essential to the improvement of undergraduate SMET education. NSF seeks to promote incentives and rewards to stimulate and motivate faculty members so that creative teaching and pedagogical scholarship become a part of the "faculty culture" at all institutions.

The opportunity to have a major impact on undergraduate education is greater than ever. Increased national recognition of the importance of SMET education, coupled with rapid growth in new learning technologies, innovations in preK-12 education, increased understanding of how students learn, and successful interdisciplinary approaches, create new opportunities for improving undergraduate education. These developments provide the foundation for systemic reform, i.e., the totality of effort required of institutions to achieve excellence in SMET undergraduate education for all students.

* African-Americans, Alaskan Natives, Hispanics, Native Americans, and Native Pacific Islanders.

Guide for DUE Program Selection



Themes: There are four important themes that are common to all DUE programs.

- **Teacher Preparation**
- **Diversity**
- **Faculty Development**
- **Integration of Technology into Education**

Applicants are encouraged to incorporate one or more of these themes into their projects. See page 4 for details.

Overview of DUE Programs

The **Course, Curriculum, and Laboratory Improvement (CCLI)** program seeks to improve the quality of SMET education for all students and targets activities affecting learning environments, content, and educational practices. The program has three tracks:

1. *Educational Materials Development (CCLI-EMD)*

Projects are expected to produce innovative materials that incorporate effective educational practices to improve student learning in SMET content areas. Such materials are expected to be appropriate for national dissemination and implementation. For example, projects to develop textbooks, software, or laboratory materials are appropriate.

2. *Adaptation and Implementation (CCLI-A&I)*

Projects are expected to result in improved SMET education at institutions through adaptation and implementation of exemplary materials, laboratory experiences, and educational practices, in such a way that further curricular change will be catalyzed at the institution. Institutional matching (from non-federal sources) is required. Proposals may request any items normally supported by NSF or only instrumentation or laboratory equipment.

3. *National Dissemination (CCLI-ND)*

Projects are expected to engage in large-scale, national dissemination of exemplary materials and practices, and provide faculty professional development through a national offering of workshops, short courses, or related activities.

The **NSF Collaboratives for Excellence in Teacher Preparation (CETP)** program seeks to achieve significant and systemic improvements in the preparation of prospective pre-Kindergarten through grade 12 (preK-12) teachers for improved student learning in science and mathematics. Projects are required to involve substantial collaboration of faculty and administrators in SMET disciplines with their counterparts in education and with preK-12 teachers. Projects should particularly address the need to attract students from groups currently underrepresented in SMET education. Other priorities of the program are the need to attract SMET majors into the teaching profession, and the need to provide a good science and mathematics background to students majoring in other fields who intend to become teachers.

CETP features two tracks: (1) *Institutional Focus (CETP-IF)* and (2) *System-wide Focus (CETP-SF)*. Both tracks encourage projects whose collaborative activities encompass the entire continuum of teacher preparation from recruitment of prospective teachers through support for novice teachers. Furthermore, proposals for projects that focus more narrowly on one or more specific teacher preparation components, as described on page 12, may be submitted to the CCLI or ATE programs, as appropriate. These projects should address the goals of CCLI and ATE, respectively.

The **Advanced Technological Education (ATE)** program is managed jointly by DUE and the Division of Elementary, Secondary, and Informal Education. The program promotes exemplary improvement in the education of technicians at the national and regional levels by supporting curriculum development and program improvement in undergraduate and secondary school SMET education. To achieve its goals, the ATE program seeks to use the resources of the nation's associate degree-granting institutions in alliances with four-year colleges and universities, secondary schools, business, industry, and government. Faculty from four-year institutions, as well as representatives from business and industry, are encouraged to collaborate with two-year institutions in developing ATE proposals.

ATE solicits proposals in two tracks: (1) *Projects (ATE-PR)* focusing on one or more aspects of curriculum development and program improvement, including the adaptation and implementation of exemplary educational materials and practices that were originally developed by other projects; and (2) *Centers of Excellence (ATE-CE)*, national or regional hubs that focus comprehensively on some area of advanced technological education.

Although the activities described within these programs are expected to comprise the majority of projects supported, proposals that address other mechanisms for improving undergraduate education will be considered.

For information on NSF programs in undergraduate education not described in this announcement, see NSF's *Guide to Programs* (NSF 99-4) or contact DUE (see inside front cover for contact information).

Common Themes Across DUE Programs

DUE has identified four themes for targeted emphasis. Features that address these themes may be integrated, as appropriate, into projects funded through DUE programs.

TEACHER PREPARATION

The SMET preparation of prospective preK-12 teachers is a major emphasis within DUE, supporting the premise that the preparation of prospective teachers is the responsibility of SMET faculty and departments, as well as of colleges and schools of education. Although wide ranging in approach, all funded teacher preparation activities should contribute to innovative instructional programs that attract and retain the ablest of our nation's students for careers in the teaching profession.

In addition to projects supported through the NSF Collaboratives for Excellence in Teacher Preparation, other projects directly addressing teacher preparation are encouraged for submission to the CCLI or ATE programs:

- **Projects with a Teacher Preparation Emphasis**—CCLI or ATE projects which incorporate the preparation of future teachers as a significant feature.
- **Teacher Preparation Component Projects**—CCLI or ATE projects which place primary emphasis on the preparation of future teachers—see page 12 for description of these projects.

Refer to the CETP program section (page 10) for information regarding teacher preparation. Projects are expected to provide prospective teachers with in-depth knowledge of subject matter and with knowledge of instructional practices necessary to meet the challenges posed by standards-based education, changing technology, and an increasingly diverse student body.

DIVERSITY

All DUE programs encourage proposals that strengthen undergraduate education by increasing the participation and success in SMET of women, underrepresented minorities, and persons with disabilities. Projects that can serve as models for increasing the number who successfully pursue careers in SMET areas and in preK-12 teaching of science and mathematics are of particular interest.

DUE seeks to take full advantage of ideas from individuals and institutions who can bring their experience and expertise to bear on the challenge of increasing the diversity of the SMET workforce and improving the SMET preparation of underrepresented groups. Proposals from institutions with

significant enrollments of underrepresented persons that have not been previous participants in DUE programs are particularly encouraged.

FACULTY DEVELOPMENT

Quality undergraduate education derives from faculty members who are intellectually vigorous, up-to-date in their fields, and experienced in effective teaching methods. Faculty professional development is critical to support curricular design and implementation. Through all its programs DUE provides support to supplement course, curriculum, and laboratory improvement efforts with faculty development activities.

DUE promotes activities that enhance the abilities of faculty members to adapt and introduce newly developed course and laboratory materials, pedagogical methods, and technologies into the learning environment. In addition to enhancement of current faculty, projects are encouraged to integrate activities that address the preparation of future faculty.

INTEGRATION OF TECHNOLOGY

All DUE programs seek proposals for projects that use current and emerging technologies to improve learning and teaching in SMET. These proposals should integrate innovative educational strategies, appropriate content, and sound evaluation with current technology to produce more effective learning environments. Projects may also develop or adapt materials and strategies to improve distance learning, incorporating effective uses of technology.

The use of technology in education is an important component of the NSF-wide Knowledge and Distributed Intelligence (KDI) effort (refer to NSF 99-29). The recent explosive growth in computer power and connectivity is reshaping relationships among people and organizations, and transforming the processes of discovery, learning, and communication. As a result of the technological advances, we have unprecedented opportunities for providing rapid and efficient access to enormous amounts of knowledge and information, for studying vastly more complex systems than was hitherto possible, and for advancing in fundamental ways our understanding of learning and intelligence in living and engineered systems. KDI promotes the realization of these opportunities. Results from KDI will have a major impact on learning and research in SMET. DUE encourages proposals that apply positive results from KDI to improve learning and teaching.

General Program Information

ELIGIBILITY

Eligible Fields and Disciplines

Proposals may be submitted for support of projects in any field of science, mathematics, engineering, and technology ordinarily supported by NSF. A list of disciplines and corresponding codes is included on page 30. Projects involving fundamental scientific, mathematical, or engineering concepts within technical, professional, or pre-professional programs are appropriate. Multidisciplinary and interdisciplinary proposals are especially encouraged.

Specifically excluded are projects that address clinical fields such as medicine, nursing, clinical psychology, and physical education, and those that primarily involve social work, home economics, the arts, and the humanities.

Eligible Institutions and Individuals

Proposals are invited from organizations in the United States and its territories: two-year colleges, four-year colleges, universities, professional societies, consortia of institutions, and nonprofit and for-profit organizations that are directly associated with educational or research activities. Proposals from a formal consortium should be submitted by the consortium; proposals from an informal consortium or coalition may be submitted by one of the member institutions. For additional details see *Grant Proposal Guide* (GPG, NSF 99-2). Each Principal Investigator (PI) may submit only one proposal to each program per deadline.

COLLABORATIONS

Projects may involve a single institution, collaboration with business and industrial partners, or collaboration among several institutions. For example, projects may include collaborative efforts that improve the transition of students between the collaborating institutions, such as transfer between two- and four-year institutions.

RESEARCH ON TEACHING AND LEARNING

Projects should be well-founded on research conducted on teaching and learning. In particular, proposals should describe how research has informed the project to date and plans for research to inform the project's further development. Also,

the proposal should describe how changes in student learning resulting from the project will be assessed.

EVALUATION OF PROJECT

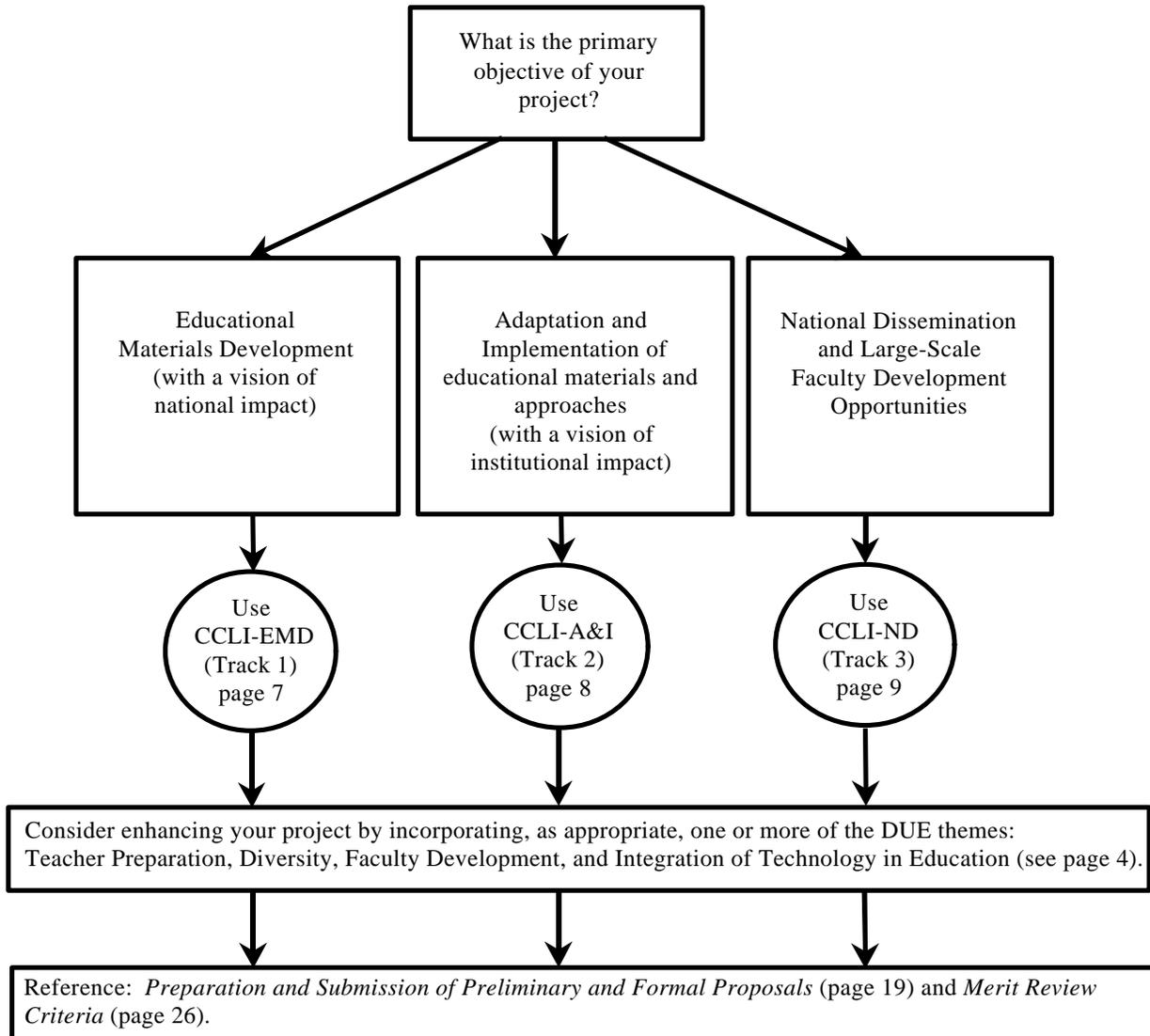
Projects supported under DUE programs are inherently experimental in character. Thus, it is essential that the methodologies and results of these projects be subjected to careful evaluation. The evaluation should inform project development, including, for example, the development of curricular materials or the faculty development necessary for effective implementation. The evaluation should also provide credible data on what the project has accomplished to inform the project team and their institution(s), the relevant scientific community, and NSF. In order to develop effective methods for evaluation, persons experienced in evaluation should be involved. The scale and cost of evaluative activities should be appropriate to the size and scope of the project. NSF may work with the applicant during the award process to develop special evaluation and dissemination mechanisms, when the scale and cost of a project merit it. NSF may request the cooperation of individual projects in the collection of specific data via surveys or other mechanisms to enable evaluation of DUE's programs.

For more information regarding project evaluation refer to *User-Friendly Handbook for Project Evaluation* (NSF 93-152; reprinted 6/97) and *User-Friendly Handbook for Mixed Method Evaluations* (NSF 97-153).

DISSEMINATION OF RESULTS

For the desired national impact to be achieved, project results must be evaluated and then disseminated widely within the appropriate academic, scientific, and technical communities. The value of a project depends on the quality and utility of what is learned or produced and upon the breadth and effectiveness of the related dissemination activities; therefore, plans for dissemination of project results are given significant weight in the review of proposals. Where applicable, applicants should describe existing or planned arrangements with commercial publishers in their proposals. Multiple dissemination approaches are encouraged. For additional guidance see *Announcement and Administration of Awards* on page 28.

Guide for CCLI Proposal Development



Course, Curriculum, and Laboratory Improvement (CCLI)

Deadline for Formal Proposals June 7, 1999 (annual June deadlines are anticipated)
Electronic submission via FastLane is required for CCLI National Dissemination proposals.

Contacts for Program Tracks:

Educational Materials Development (CCLI-EMD) (703) 306-1681
Adaptation and Implementation (CCLI-A&I) (703) 306-1671
National Dissemination (CCLI-ND) (703) 306-1668

A. Purpose

The goal of the Course, Curriculum, and Laboratory Improvement (CCLI) program is to revitalize and improve the quality of undergraduate science, mathematics, engineering, and technology (SMET) education obtained by all students at all types of institutions.

CCLI supports projects at all levels of undergraduate education, with emphasis on introductory-level courses, curricula, and laboratories. The development and implementation of materials and approaches for multi- and interdisciplinary courses, curricula, and laboratories are especially encouraged. Such efforts should reflect collaboration among faculty members in the relevant disciplines.

B. Program Design

The CCLI program has three tracks which emphasize, respectively, the development of new educational materials and practices, the adaptation and implementation of previously developed exemplary materials and practices, and the national dissemination of exemplary materials and practices. Proposals may contain features appropriate for more than one track. However, applicants must identify on the *Cover Sheet* and on the *Project Data Form (Form 1295)* the track in which they wish their project to be reviewed.

The cross-cutting themes of teacher preparation, diversity, faculty development, and integration of technology (see page 4) should be incorporated into CCLI projects as appropriate. See page 12 for additional information for projects that place a primary emphasis on the preparation of future teachers.

In CCLI, “laboratory” includes experiences ranging from those fully integrated into teaching and learning within a course to a separate component in the curriculum. The setting may involve, for example, a field site, an observatory, a computer room, or an integrated laboratory/classroom, as well as the traditional laboratory.

Note: The “Systemic Changes in the Undergraduate Chemistry Curriculum—Adapt and Adopt” (CCLI-AA) emphasis no longer exists as a unique competition. Proposals should now be submitted through the CCLI-A&I track.

Track 1: Educational Materials Development (CCLI-EMD)

This track supports course, curriculum, and laboratory development projects that will result in innovative educational materials (e.g., electronic, print, multi-media) or equipment incorporating effective educational practices for improved student learning. Although perhaps initially conceived in local course or laboratory development, these projects are expected to address national needs in undergraduate SMET education. In particular, projects are expected to produce innovative materials of a quality and significance appropriate for national distribution, adaptation, and implementation. NSF funding provides support for the development, widespread site testing and evaluation of these materials and methods, and efforts to promote their effective implementation. The project scope may be, for example, a set of modules, a course, a series of courses, or an entire curriculum. Projects may involve a single discipline or may cut across disciplinary boundaries.

Expected outcomes of funded projects include:

- innovative materials for national distribution that have been evaluated and site-tested;
- teaching and learning strategies that have been demonstrated to be effective at diverse sites;
- effective national dissemination and faculty professional development in the use of materials and pedagogies; and
- commercial or other self-sustaining distribution of materials.

The Project Description should describe the expected outcomes and the plan to achieve them.

In addition to the projects described above, “proof-of-concept” proposals may also be submitted to the EMD track. The “proof-of-concept” will vary with projects but, in general, is expected to demonstrate the scientific, educational, and commercial merit and feasibility of an idea. The results could serve as the basis for a full development proposal and might,

for example, provide a prototype product (e.g., module, video). It is also expected that results from proof-of-concept grants may attract support from funding sources other than NSF.

Expected outcomes of proof-of-concept grants are, for example:

- a prototype product or other information establishing a “proof of concept”;
- a plan for full development;
- a project team/partners for full development;
- identification of test sites; and
- plans for self-sustained distribution of products, such as identification of a potential commercial publisher.

Track 2: Adaptation & Implementation (CCLI-A&I)

Note: Projects for adaptation and implementation of materials relating to advanced technological education should now be submitted to the ATE program (see page 16).

This track promotes the improvement of SMET education through adaptation and implementation of exemplary materials, laboratory experiences, and educational practices, in such a way that further curricular change will be catalyzed at the institution. CCLI-A&I projects should effect change within or across departments or other institutional units, by having broad faculty and administrative support.

Projects to adapt and implement high quality curricula, materials, and/or techniques might include, for example:

- the incorporation of laboratory experiments or field experiences that effectively engage students in scientific processes and exploration of scientific concepts;
- the adaptation and testing of exemplary materials for use by a student audience significantly different from the one for which they were originally developed;
- the enhancement of teaching and learning through the use of resources, particularly instructional and information technologies, demonstrated to be of high quality;
- a faculty development program in support of the curricular adaptation and implementation;
- the promotion of critical thinking, problem-solving skills, and creativity;
- the development and use of collaborative learning, student teaching, learning communities, and other innovations that aim to improve pedagogy in courses;
- the integration of the study of pedagogy and content in core courses for prospective preK-12 teachers; or
- the improvement of the way in which postdoctoral students, graduate students, and advanced undergraduates contribute to undergraduate education, as well as their development as possible future faculty.

Project scope may range from an individual course or laboratory to a more comprehensive effort that impacts entire curricula or programs. The table on page 9 indicates the budget range based on the scope of the project. As in the former Instrumentation and Laboratory Improvement (ILI) program, the requested funds may be entirely for laboratory equipment or instrumentation. However, funding requests may also include all items normally supported by NSF (see page 23).

Adaptation and effective implementation require creative efforts, and provide opportunities for evaluation of exemplary materials in alternative settings. Proposers of CCLI-A&I projects are encouraged to adapt and implement high-quality educational materials and effective educational practices developed elsewhere through NSF-funded projects or other efforts. Materials for adaptation may be drawn from more than one project.

Information about curriculum and laboratory development projects funded through DUE programs can be obtained via the DUE Project Information Resource System (see page 29). Many of these previously funded projects are in progress, and proposers may wish to contact the project PIs for further information.

For example, *Systemic Changes in the Undergraduate Chemistry Curriculum* and *Mathematical Sciences and Their Applications Throughout the Curriculum* are two NSF Initiatives that have funded large-scale, multi-year projects which are still underway. All projects involve collaborations of several institutions. Information on these projects can also be obtained through the DUE Web site or Information Center.

Expected outcomes of funded projects include:

- adaptation and implementation of innovative practices and materials for course, curriculum, or laboratory improvements;
- faculty professional development in support of educational improvements;
- initiation of efforts to build on the project, to broaden its impact, and effect continuing change at the institution within the discipline or across disciplines;
- an evaluation that informs the institution and others of the effectiveness of the implemented materials and practices, as well as informs development of the project; and
- a national model exemplifying effective implementation of practices to improve student learning and effective dissemination to the broader community.

Proposals must describe the materials and practices being adapted and the innovations required to effect the desired improvements.

An outcome of CCLI-A&I projects should be implementation that impacts the funded institution(s). Critical consideration

in the review of CCLI-A&I proposals are the institutional commitment and plans to build on the project. Proposals must describe in specific terms the extent of faculty and administration support. Furthermore, the proposal must clearly describe how the project fits into departmental and institutional goals and plans.

The CCLI program discourages proposals that:

- are justified solely on the basis of financial need or increased enrollments;
- seek replacement equipment without a well-conceived plan for enhancing learning;
- provide only the basic level of support for SMET instruction needed to maintain a viable program;
- replicate an existing program without adaptation needed for the implementation site and student audience; or
- describe a project that will not serve as a basis for further change at the institution.

Special Note on CCLI-A&I Matching Requirements: In all DUE programs, requests for equipment must be matched by funds or equipment from non-Federal sources equal to or greater in value than the funds requested from NSF. In the Adaptation and Implementation track of CCLI, in recognition of the institutional commitment required to conduct successful projects and the particular benefit to the funded institution of A&I projects, the *entire budget request* must be matched by non-Federal resources equal to or greater in value than the funds requested of NSF. The match on the *entire budget* is a requirement only for CCLI-A&I projects. (See page 23 for more information on Institutional Matching Requirements.)

Track 3: National Dissemination (CCLI-ND)

This track supports the national dissemination of exemplary materials and practices through the provision of opportunities for faculty professional development. Such opportunities should be designed to enable current faculty, as well as prepare future faculty, to introduce new content into undergraduate courses, to investigate effective educational practices, and to interact meaningfully with experts in the

field. Funded projects could also serve to catalyze the transfer of new scientific information obtained from research projects into the undergraduate curriculum, a process that enhances the integration of research and education.

Awards will be made to organizations that are capable of providing a large-scale, national faculty development effort in a variety of disciplines and topical areas. While it is expected that the primary mechanism for such efforts will be faculty workshops and short courses, distance learning opportunities (e.g., via the Internet) and other means of dissemination are encouraged. Eligible activities are not restricted to the dissemination of results from NSF-funded projects.

It is anticipated that only a few awards will be made in CCLI-ND. Organizations considering submission of a proposal within this track should contact a DUE Program Director at (703) 306-1668. Following this initial discussion, a preliminary project description should be submitted for comment, no later than six weeks before the formal deadline of June 7, 1999. This preliminary project description of **not more than** 3 single-spaced pages should include a project outline, a description of personnel involved, and an approximate budget.

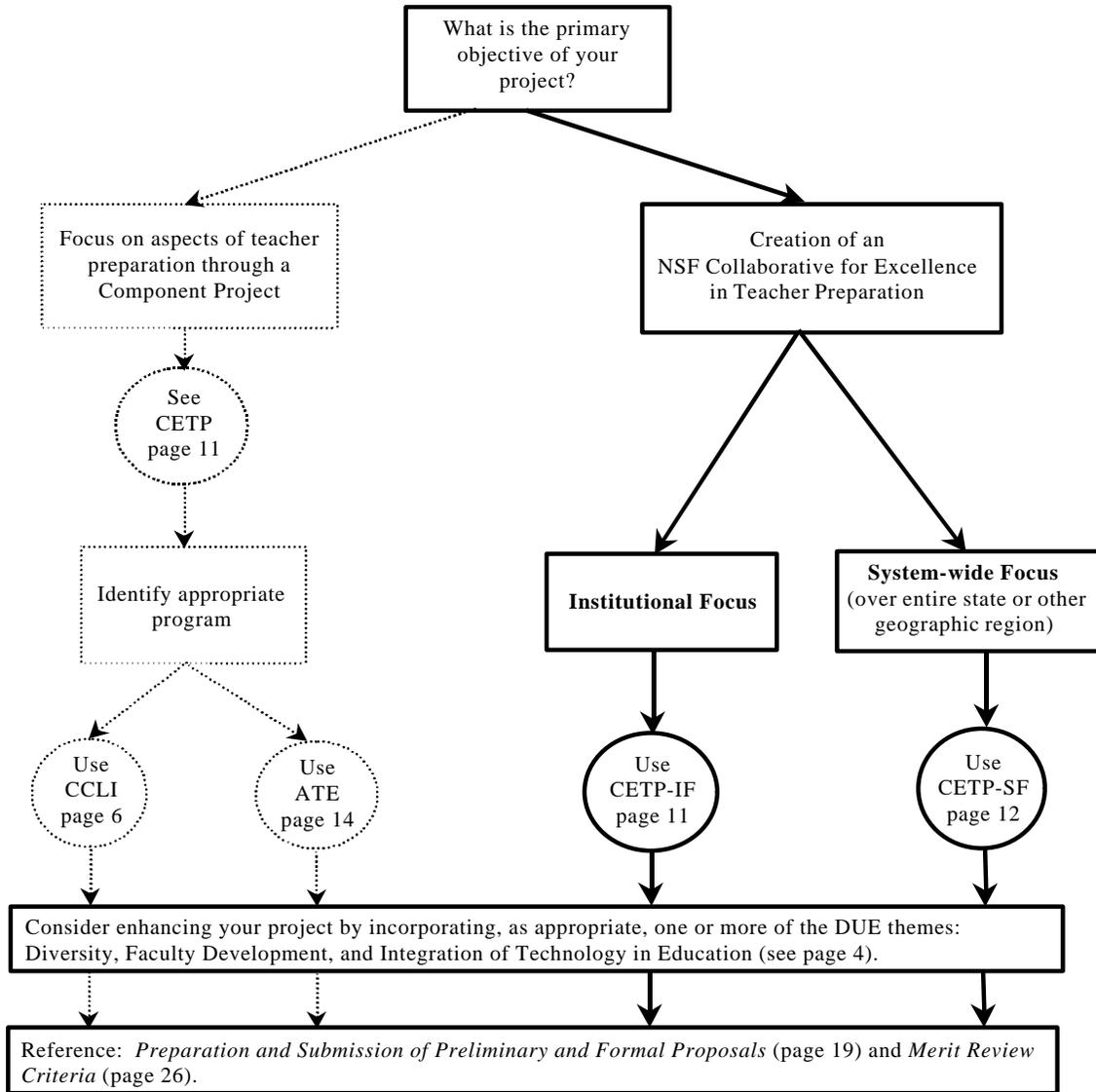
C. Preparation and Submission of Proposals

Please refer to *Preparation and Submission of Preliminary and Formal Proposals* (page 19) and *Proposal Review Information* (page 26).

The number and size of awards will depend on the quality of the proposals received and the availability of funds. Grant duration is typically 2-3 years but may be requested for up to five years. The table below indicates an expected range of total NSF/DUE support for CCLI projects. The minimum budget request is \$5,000.

Tracks	Project Scope (expected range of total NSF/DUE support)	
Educational Materials Development	Proof of Concept (up to \$75,000)	Full Development (up to \$500,000)
Adaptation & Implementation	Course/Laboratory (up to \$100,000)	Comprehensive Curriculum (up to \$200,000)
National Dissemination	Large-Scale Faculty Professional Development (up to \$1,000,000)	

Guide for CETP Proposal Development



NSF Collaboratives for Excellence in Teacher Preparation (CETP)

Deadline for Preliminary Proposals May 1, 1999
Deadline for Formal Proposals September 1, 1999
Electronic submission via FastLane is required for CETP System-wide Focus formal proposals.
Contact (703) 306-1669

A. Purpose

The NSF Collaboratives for Excellence in Teacher Preparation (CETP) program is a response to the national need to produce and retain increasing numbers of teachers well-qualified to teach mathematics and the sciences. The purpose of the CETP program is to achieve significant and systemic improvement in the science, mathematics, engineering, and technology (SMET) preparation of prospective pre-Kindergarten through grade 12 (preK-12) teachers.

CETP promotes the development of preK-12 teachers who are competent in their subject matter; able to teach effectively in these disciplines; excited about incorporating mathematics, technology, and the sciences into their daily classroom activities; and able to implement the national mathematics and science standards. Proposals are sought for projects that recruit and develop future teachers who are successful in addressing the varied learning styles, backgrounds, and needs of their students. Particular attention is needed to recruit prospective teachers from underrepresented groups, so the teachers of tomorrow reflect the diversity of the students they will teach.

Teacher preparation is the responsibility of SMET faculty and departments, as well as of schools and colleges of education. Effective teacher preparation programs require full institutional support and the concerted effort of many stakeholders, including faculty and administration from two-year, four-year and research institutions; school districts; the business community; and state departments of education.

B. Program Design

Several opportunities for funding are offered:

- **NSF Collaboratives for Excellence in Teacher Preparation**
 - Institutional Focus
 - System-wide Focus
- **Teacher Preparation Component Projects** supported via the ATE and CCLI programs

Every CETP (Institutional or System-wide) project is expected to be a systemic effort addressing the entire range of activities in the **continuum of teacher preparation** (see next page). Projects focusing on one or more specific

components of teacher preparation in SMET should be submitted to CCLI or ATE, as appropriate.

Special projects are also supported. Examples include studies, national symposia or workshops that will increase understanding of the issues related to SMET teacher preparation. Proposers should first discuss ideas for special projects with a Program Director (703-306-1669).

NSF Collaboratives for Excellence in Teacher Preparation

CETP projects should be guided by a coherent vision and philosophy regarding the preparation of teachers. Projects must be multi-faceted and designed to result in comprehensive change in a program producing significant numbers of preK-12 teachers. CETP projects are collaborative efforts, engaging SMET and education faculty and their departments, preK-12 teachers and administrators, and business and community partners. The ultimate result should be a substantial increase in the number of teachers who are well prepared both in the basic disciplines of science and mathematics and the pedagogical and assessment methodologies consistent with the national standards. All projects should provide a basis for other institutions and faculty to benefit from the results of the project.

Track 1: Institutional Focus (CETP-IF)

This track supports projects that address the reform of comprehensive teacher preparation programs at institutions that produce a large number of teachers. Although this track supports projects with a primary focus on a single institution, it may be appropriate to, for example, include collaboration with feeder institutions (two- and four-year colleges). Institutional Focus awards will be made for up to \$500,000 per year for a duration of 1 to 3 years.

Track 2: System-wide Focus (CETP-SF)

The scope of System-wide Focus projects extends beyond that of Institutional Focus projects by encompassing an entire university system or a collection of institutions that spans a state or other geographic region. System-wide Focus awards will be made for up to \$1,000,000 per year for a duration of 3 to 5 years.

Teacher Preparation Component Projects

Consistent with DUE's cross-cutting programmatic emphasis on the science and mathematics preparation of prospective preK-12 teachers, CCLI or ATE projects that incorporate building blocks for or components of comprehensive reform of teacher preparation are encouraged. Projects must be designed to meet the goals of CCLI or ATE, respectively, and will be considered in accordance with the specific program requirements found in those program sections (pages 6 and 14 respectively).

Projects should focus on one or more components of the **continuum of teacher preparation** (see below). The proposal must indicate how the project contributes to the teacher certification program at the institution. Projects should be designed to attract outstanding students to the teaching profession while improving the quality and accessibility of mathematics and science teacher preparation programs.

C. Continuum of Teacher Preparation

The range of activities expected of CETP projects spans the entire **continuum of teacher preparation** which includes recruitment, instruction in content, pedagogy, classroom management, early field experiences, credentialing, and induction and support of novice teachers. In meeting the immediate national demand for high-quality mathematics and science teachers, the scope of teacher preparation programs has been broadened to include the preparation of teachers from non-traditional sources such as para-professionals and mathematicians, scientists, engineers, or technicians considering career changes.

Teacher Preparation Components

The components listed below indicate the range of activities that are necessary for comprehensive teacher preparation efforts. The list illustrates the breadth of effort required and should not be considered as limiting in nature.

Programs:

- curriculum consistent with the national science and mathematics standards, including: core courses integrating the study of pedagogy and content; interdisciplinary courses including the sciences, mathematics, engineering, the social sciences and humanities; and post-baccalaureate, pre-certification courses;
- effective teaching strategies such as cooperative learning, inquiry-based instruction, appropriate use of

laboratories and field experiences, attention to issues of equity, and the use of technology in the classroom;

- master teacher-in-residence programs that involve preK-12 master teachers in planning, implementing and assessing teacher preparation courses and programs (including mentoring prospective and novice teachers);
- courses and experiences that prepare prospective teachers to work with special populations;
- programs that specifically address the needs of urban or rural areas;
- assessment methods that better reflect the objectives of new educational materials and practices;
- application and conduct of research in teaching and learning;
- programs that bridge, establish linkages to, and coordinate with, other NSF science and mathematics education reform program efforts such as Local Systemic Change (LSC), State Systemic Initiatives (SSI), Urban Systemic Initiatives (USI), Rural Systemic Initiatives (RSI), Comprehensive Partnerships for Mathematics and Science Achievement (CPMSA), or Alliances for Minority Participation (AMP).[†]

Students and Faculty:

- innovative incentives for recruiting into teaching careers both traditional and nontraditional students, including outstanding SMET students, SMET professionals considering mid-career changes, or teacher aides interested in becoming certified as teachers;
- mentoring that addresses the needs of both prospective and novice teachers;
- field experiences such as research experiences for pre-service teachers; tutoring and classroom experiences; internships in industry and museum settings; and summer teacher corps;
- college faculty and pre-college faculty exchange experiences;
- collaboration with school districts to ensure appropriate placement of students and novice teachers, and strong support systems for novice teachers linking pre-service to active service;
- community-based activities that promote teaching as a career.

D. Special Requirements for CETP Proposals (Institutional and System-wide)

Within the Detailed Project Plan section of the Project Description, provide a clear, concise description of the current teacher preparation program and the program you hope to develop through the project. Explain how the project will lead to full institutionalization of a

comprehensive and cohesive program to improve the mathematics and science content and instructional preparation of preK-12 teachers. Indicate how the project will address the entire range of activities in the continuum of teacher preparation.

CETP leadership and design teams **must include**:

- as the Principal Investigator, an institutional leader within the SMET discipline-based faculty;
- extensive and substantive collaboration among SMET faculty, education faculty, and experienced preK-12 teachers, including a critical mass of those involved in teaching introductory courses in mathematics, the sciences, and, as appropriate, engineering and technology;
- faculty and administrators from two-year colleges, as appropriate, in recognition of the significant role these institutions play in the teacher production pipeline;
- active participants at all levels of leadership from each of the collaborating stakeholders including institutional and school district administrators, and from groups underrepresented in science, mathematics, and engineering.

All CETP proposals should clearly describe the management structure to be developed, delineating: the specific roles and responsibilities of each of the collaborating institutions and Principal Investigators; the support for participating departments, faculty and teachers; and the methods for project assessment and evaluation.

Evidence of institutional commitment is a requirement for all CETP projects. Proposals should provide clear evidence of the departmental and institutional commitment necessary to ensure institution-wide support. Such evidence should include letters of support from appropriate university administrators. See guidelines regarding Appendices for CETP projects on pages 24-25.

Institutionalization should include plans for: the SMET departments to integrate prospective teachers into their culture; adaptation and implementation of materials and approaches by affected institutions, school districts and

education agencies; and development of a management infrastructure among the collaborating institutions to ensure the sustainability and continuation of successful projects beyond the period of NSF financial support.

CETP proposals should also indicate clear connections with existing NSF[†] or other systemic projects, including other federal, state, local or privately funded efforts.

Indicate how the project will serve as a national model of an exemplary teacher preparation program. Be specific concerning expected outcomes. Specify the anticipated number and types of students and faculty affected, number of teachers and schools participating as field sites, and, as appropriate, effects on certification standards.

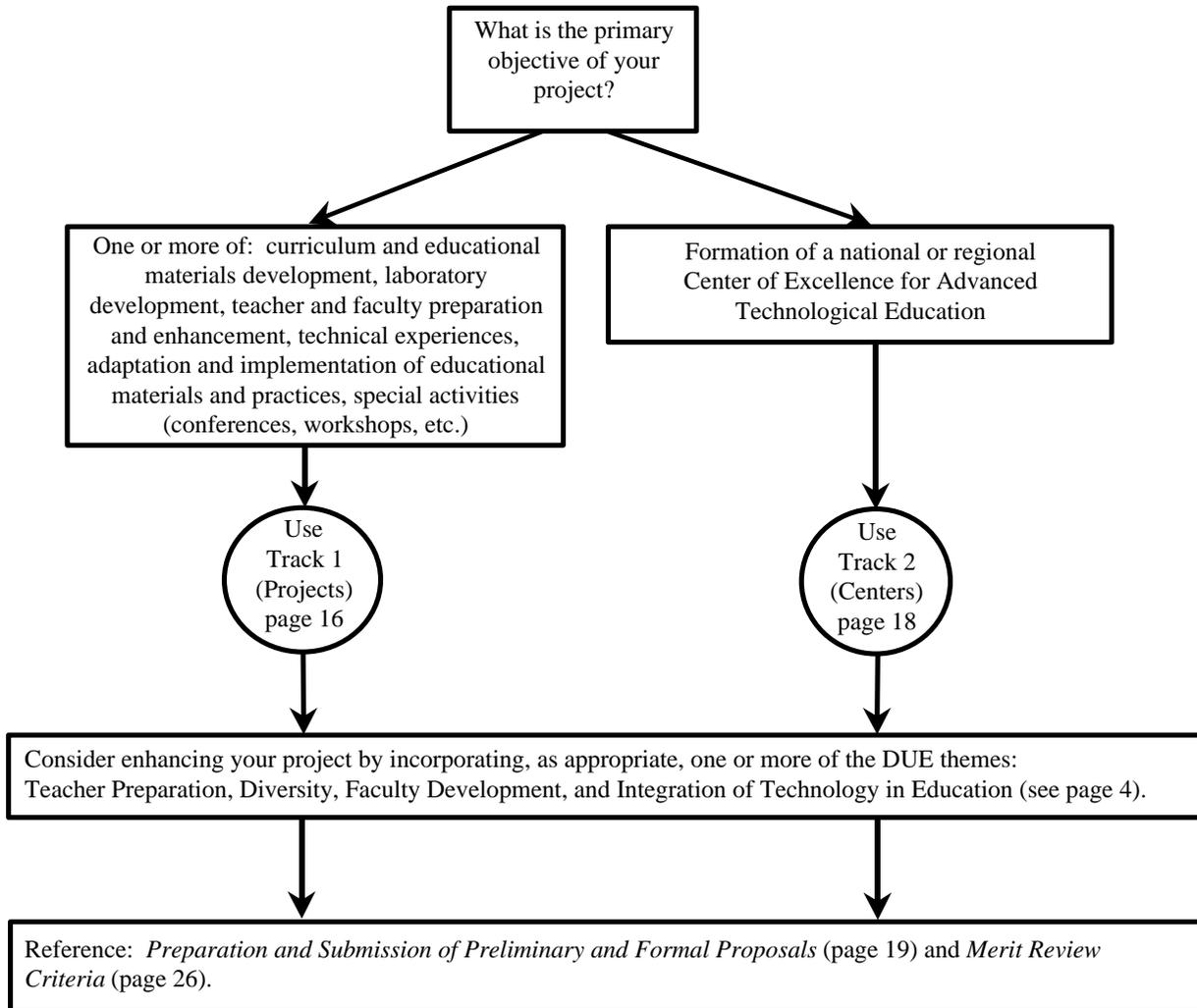
E. Preparation and Submission of Preliminary and Formal Proposals

It is strongly recommended that institutions planning to submit a formal proposal first submit a preliminary proposal. Both the formal proposal and the preliminary proposal should reflect extensive planning and discussion among scientists, science educators, mathematicians, mathematics educators, preK-12 teachers, and university and school administrators.

In addition to the information contained in section D above, please refer to *Preparation and Submission of Preliminary and Formal Proposals* (page 19) and *Proposal Review Information* (page 26).

[†] Information concerning any of these programs may be obtained from the NSF Web site or by phone. Information about LSC may be obtained from the Division of Elementary, Secondary, and Informal Education at (703) 306-1620. Information about SSI, RSI and USI may be obtained from the Division of Educational System Reform at (703) 306-1690. Information about CPMSA and AMP may be obtained from the Division of Human Resource Development at (703) 306-1640.

Guide for ATE Proposal Development



Advanced Technological Education (ATE)

Deadline for Preliminary Proposals	April 14, 1999
Deadline for Formal Proposals	October 14, 1999
<i>Electronic submission via FastLane is required for ATE Center formal proposals.</i>	
Contact	(703) 306-1668

A. Overview

The Advanced Technological Education (ATE) program promotes improvement in the education of science and engineering technicians at the undergraduate and the secondary school levels; it particularly targets two-year colleges. The program is managed jointly by the Division of Undergraduate Education (DUE) and the Division of Elementary, Secondary, and Informal Education (ESIE).

It has become increasingly apparent that the quality of America's high-technology workforce depends on strong and innovative science, technology, engineering, and mathematics education at associate degree granting institutions. For this reason, *ATE focuses on two-year colleges and expects two-year colleges to have a leadership role in all projects.* Effective technological education programs should involve partnerships between two-year colleges, four-year colleges and universities, secondary schools, business, industry, and government, and should respond to industry's need for well-prepared workers having adaptable skills.

Activities in support of advanced technological education may include the adaptation of exemplary educational materials, courses, and curricula in new educational settings; the design and implementation of new materials, courses, laboratories, and curricula; the preparation and professional development of college faculty and secondary school teachers; and internships and field experiences for students, faculty, and teachers. Activities may have either a national or a regional focus, but not a purely local one, and they may aim to affect either specialized technology courses or the core science and mathematics courses that serve as prerequisites for specialized technology courses. Fields supported by ATE include, but are not limited to, agricultural technology, biotechnology, chemical technology, computer and information technology, electronics, environmental technology, geographic information systems, manufacturing and engineering technology, marine technology, multimedia technology, and telecommunications.

All projects supported by ATE must be guided by a coherent vision of technological education—a vision that recognizes the needs of the modern workplace, of students as lifelong learners, and for articulation of educational programs at different levels. ATE especially encourages efforts which:

- integrate science, mathematics, and technology;
- develop innovative educational approaches in core science, mathematics, and technology courses at the sec-

ondary school and college levels, so that students with diverse needs can acquire strong backgrounds that enable them to successfully complete programs in technological fields;

- implement the national science, mathematics, technology, and industry standards in education;
- recognize current and projected occupational requirements and give prospective technicians insight into real-world work environments;
- serve the needs of not only first-time students but also returning students and workers seeking new career opportunities or new skills;
- link educators and educational programs in two-year colleges, four-year colleges and universities, secondary schools, and industry;
- aim to spur major changes and significant improvements beyond the grantee institution and to produce educational materials that can be used nationally; and
- address one or more themes that DUE or ESIE has targeted for special emphasis—i.e., teacher preparation, professional development for faculty and teachers (including workplace experiences), integration of current and emerging technologies into education, and increasing diversity within the technical workforce.

Projects involving multiple investigators and institutions must have a strong plan for project management, commensurate with the number of participants and the complexity of the project's activities.

B. Eligibility

Eligible Institutions. Proposals are invited from two-year colleges and other associate degree granting institutions, two-year college systems, consortia of two-year colleges, and other consortia (involving, for example, four-year colleges and universities, secondary schools, professional societies, and educational research and development organizations) that include two-year colleges in leadership roles. Proposals from a formal consortium should be submitted by the consortium; proposals from an informal consortium should be submitted by one member of the consortium.

Eligible Costs. ATE will support new design or development costs, as well as costs associated with adapting and implementing already developed educational materials, courses, and curricula. NSF funds may not be used to support expenditures that would normally be made in the absence of an award.

C. Program Design

ATE expects to support proposals in two tracks:

Track 1: Projects

While ATE Centers of Excellence (see Track 2 below) are expected to be comprehensive in scope, ATE Projects may focus more narrowly on one or more of the categories described in subsections a-f below. Multifaceted projects that cut across the categories below are especially encouraged.

a. NEW EMPHASIS: Adaptation and Implementation

Since the first ATE awards were made in 1994, many ATE projects have developed high-quality educational materials, novel degree programs, effective educational practices, and thriving partnerships involving education, industry, and government. These results deserve to be disseminated, adapted, and implemented to meet needs in other institutional settings. In addition, as the ATE program has matured, fruitful discussions and collaboration have taken place among projects with similar foci. The program wishes to foster continued community-building and dialogue among projects, so that effective educational strategies can achieve the broadest possible recognition and impact. Consequently, Track 1 will support proposals for the adaptation and implementation of exemplary educational materials, courses, and curricula that have been developed by other ATE projects, as well as exemplary resources developed in other programs (including those not supported by NSF) that can be adapted to technological education.

Proposals for *Adaptation and Implementation* should involve an innovative use or a significant extension of resources developed in other projects, not merely the duplication of a course, program, or pedagogy in a different location. Proposals might include, for example:

- the adaptation and testing of exemplary materials with a student audience significantly different from the one where they were developed;
- the adaptation of materials developed for an educational program or course in one technical field to the needs of a program or course in a different technical field;
- the use of different pedagogical approaches or technologies to enhance and extend curricula;
- professional development opportunities for college faculty or secondary school teachers in support of an adapted curriculum;
- a systemic implementation of a developed program that links industries, faculty, and students; or
- a comparative evaluation of the effectiveness of an implemented course or curriculum in the new setting and in the original one.

Resources may be adapted from more than one project. Proposals should describe the materials and practices being adapted, as well as the innovations required to effect the desired improvements.

After carefully researching the existing ATE projects and Centers of Excellence in a particular area of technological education (see section D below), proposers may wish to contact the Principal Investigators of exemplary projects and centers to explore possibilities for adapting materials, establishing a new test site, or collaborating in other ways.

Awards for *Adaptation and Implementation* are normally expected to range from \$50,000 to \$200,000 per year for one to three years, depending on the complexity of the proposed activities and the number of proposed participants. Institutions are expected to contribute significant cost-sharing in *Adaptation and Implementation* projects, as one demonstration of both the strong institutional commitment required to conduct such projects successfully and the disproportionate return that an institution receives by utilizing resources that have already been developed and tested elsewhere.

b. Curriculum and Educational Materials Development

Supported activities should affect the learning environment, course content, and the experience of instruction. Projects often result in textbooks, laboratory experiments and manuals, software, CD-ROMs, videos, and other courseware. Such products are expected to be widely disseminated through publishers, conferences, workshops, electronic networks, journal articles, and other means. A project's focus may range from the substantial revision of existing materials to the creation of entirely new ones; from a few modules at a single educational level to a comprehensive curriculum for multiple years; and from a single subject to the integration of several disciplines.

Awards for *Curriculum and Educational Materials Development* normally range from \$200,000 to \$600,000 total for two to three years.

c. Teacher and Faculty Preparation and Enhancement

Secondary school teachers and college faculty play a key role in advanced technological education. It is critical that they have a sound disciplinary background, with knowledge of state-of-the-art developments and techniques in their fields; be intellectually vigorous and excited about their disciplines; employ modern teaching practices (including new instructional technologies); and regard teaching as an important and rewarding activity. They should also have opportunities to synthesize knowledge that cuts across disciplines and to interact with expert educators and practicing scientists, mathematicians, engineers, and technicians. Toward these ends, ATE promotes activities that prepare future teachers and faculty as well as activities that enhance the disciplinary capabilities, teaching skills, currency, and vitality of current teachers and faculty.

ATE seeks projects involving the development of curricula to prepare pre-service teachers and faculty for careers in technological education.

ATE seeks projects providing in-service teachers and faculty with opportunities for continued professional growth. Such projects typically include conferences, workshops, intensive seminars, industrial internships (which also fall under the *Technical Experiences* category below), or a combination of such activities. The activities typically last from a few days to several weeks and are usually conducted in the summer, with follow-up activities during the academic year. To effect long-term change, projects for teacher and faculty enhancement should normally span at least two academic years.

Awards for *Teacher and Faculty Preparation and Enhancement* normally range from \$200,000 to \$500,000 total for two to three years.

d. Technical Experiences

Well-designed technical experiences in the classroom and in a work or community environment can give students, faculty, and teachers a broad, up-to-date, real-world perspective on technical fields. Such experiences typically allow participants to:

- get hands-on exposure to applications of science, mathematics, engineering, and technology and thereby gain confidence in their abilities in technical areas;
- interact closely with working scientists, engineers, mathematicians, and technicians;
- engage in the actual practice and thought processes of science, engineering, and technology—formulating problems and questions, designing appropriate models, troubleshooting, and using technological tools;
- obtain information about various careers as technicians and become aware of the academic preparation necessary for such careers; and
- become acquainted with the environments of two-year colleges and other academic institutions, businesses and industries, government laboratories, and other research organizations.

Projects providing technical experiences may consist of any combination of activities involving instruction, problem solving, research, product development, and industrial internships. Projects ideally should provide a balance of classroom, laboratory, and field experiences. While some activities may be individualized, project activities should stress group interactions that foster collaborations among peers and provide substantive feedback. Student–faculty teams are particularly encouraged to participate in technical experiences and to translate those experiences into meaningful classroom activities that introduce other students to the role of technicians in the workplace.

Proposals should describe recruitment strategies; criteria for selection of participants; the relevance of the planned experiences to curricula; commitments by schools, colleges, or industries to provide resources for implementing project activities (including follow-up); the content of any components dealing with ethics in the workplace or career awareness; and strategies for evaluating the value of the experiences in the education of students and the professional development of teachers and faculty.

Awards for *Technical Experiences* normally range from \$50,000 to \$300,000 total for two to three years. It is expected that industrial partners will provide major support for internships and cooperative activities.

e. Laboratory Development

Laboratory or field experiences using suitable modern equipment are crucial elements in advanced technological education, especially at the two-year college level. ATE supports the development of innovative methods for using laboratory and field exercises to improve students' understanding of basic principles and for using modern instrumentation, new technologies, or applications of instruments that extend their instructional capability. ATE also encourages the establishment of equipment-sharing arrangements through consortia or Centers of Excellence.

Equipment-only requests are appropriate, although laboratory development is often coupled with the development of new educational materials, courses, or curricula. Proposals whose primary rationale is financial need or the replacement of equipment at the same level of capability are not appropriate.

Equipment funds must be matched by non-federal funds equal to or greater than the funds requested from NSF. The maximum allowed request to DUE for equipment for the life of a project is normally \$100,000 or 10% of the total NSF funding request, whichever is larger.

f. Special Activities

ATE supports a small number of conferences, workshops, and similar activities that lead to a better understanding of issues in advanced technological education. Typically, these are short-duration events and are national in scope. (Note: Activities for teacher and faculty preparation and enhancement should not be submitted in this category.)

ATE anticipates supporting two or three *Special Activities* per year, with funding normally in the \$25,000 to \$100,000 range.

At least nine months in advance of the planned activity, prospective proposers should contact an ATE Program Director in DUE at (703) 306-1668 or in ESIE at (703) 306-1620, as appropriate, and discuss the preparation of a three- to five-page preliminary proposal. Following this discussion, proposers should prepare the preliminary proposal—including a statement of the activity's objective and target audience, an

outline of the activity, a description of personnel involved, and an approximate budget—and send two copies to the cognizant Program Director. NSF staff will review the preliminary proposals and selectively encourage formal proposals.

Formal proposals for Special Activities should include (1) a summary of the project's objectives, (2) a statement of the need for the activity, (3) curricula vitae of personnel organizing and leading the activity, (4) a list of prospective participants, (5) information about the probable date(s) and time frame for the project, (6) a budget detailing the requested NSF contribution as well as support available from other sources, (7) a description of products to be disseminated, and (8) a plan for evaluating the activity's impact. (Because proceedings of conferences, workshops, etc., are usually published, requests for funding may also include publication costs.)

Track 2: Centers of Excellence for Advanced Technological Education

Centers of Excellence are comprehensive national or regional resources that provide models and leadership for other projects and act as clearinghouses for educational materials and methods.

Centers may vary in size, disciplinary coverage, and the extent of the region served. They are typically cooperative efforts involving two-year colleges, four-year colleges and universities, secondary schools, industry, business, and government. Centers must clearly articulate a vision of technological education for the future, and they must design a workable plan for achieving their vision both during the period of NSF funding and afterwards. Centers typically engage in the full range of activities associated with the various types of projects described above. In particular, centers are expected to develop high-quality educational materials, course, and curricula and to provide teacher and faculty enhancement in support of these resources. Centers are also expected to disseminate their products through commercial publishers, journals, conferences, workshops, electronic networks, and other means.

Proposals for centers should be based on a three-pronged alliance of support from (1) the NSF, (2) the proposing educational institution or consortium, and (3) local businesses, industries, and government agencies and laboratories.

Proposals for centers should detail how they intend to advance ATE's mission and special emphases. In particular, the proposals should lay out significant plans for:

- curriculum development (including the improvement of core science, mathematics, and engineering courses, as well as specialized courses in various technologies);

- the evaluation of products and student learning;
- the dissemination of educational materials and practices;
- the collaboration of educational institutions with business, industry, and government (especially with regard to identifying needed technical skills, planning curricula, and establishing internships for students and faculty);
- the articulation of courses and programs between secondary schools, two-year colleges, and four-year colleges and universities;
- the preparation and professional development of secondary school teachers and college faculty (especially two-year college faculty); and
- the recruitment, retention, and placement of students, especially those from groups underrepresented in science, mathematics, engineering, and technology.

ATE anticipates making up to two new awards for centers annually, depending on the availability of funds and the quality of proposals received. Awards are made for up to \$1 million per year for three to five years.

D. Information About Previous Awards

Abstracts for and other information about previous ATE awards can be found online at:

- the DUE Web site;
- the "Search Awards" feature of NSF's Web site; and
- DUE's Project Information Resource System (PIRS).

See inside front cover for the URLs. Information about ATE awards is also published annually in *Advanced Technological Education: Awards and Activities* (the most recent edition is NSF 98-110).

E. Preparation and Submission of Preliminary and Formal Proposals

See the section *Preparation and Submission of Preliminary and Formal Proposals*, which begins on page 19.

Preliminary Proposals. Submitting a preliminary proposal is strongly recommended before submitting a formal proposal. For proposals for Special Activities, see the instructions beginning on page 17. For all other preliminary proposals, the deadline is April 14, 1999.

Formal Proposals. For formal proposals related to a preliminary proposal, please take care to specify on the Cover Sheet of the formal proposal the proposal number that was assigned to the preliminary proposal. For proposals for Special Activities, see the instructions beginning on page 17. For all other formal proposals, the deadline is October 14, 1999.

Preparation and Submission of Preliminary and Formal Proposals

GENERAL INFORMATION

This section gives basic information needed to submit a proposal. Proposers should also consult the *Grant Proposal Guide (GPG, NSF 99-2)* and the *Proposal Forms Kit (PFK, NSF 99-3)* for additional guidance and required forms. To facilitate proposal preparation, answers to Frequently Asked Questions are available at the NSF Web site <<http://www.nsf.gov/bfa/cpo/policy/ques.html>>.

DUE now requires use of the NSF FastLane system for some proposal submission and grant administration functions (see the FastLane information on pages ii–iii). FastLane can be accessed from NSF’s home page on the World Wide Web.

Except as modified by the guidelines set forth in this announcement (in particular, the maximum page limits given on page 21 and guidelines for appendices on page 24), standard NSF guidelines contained in *GPG* are applicable.

More information is contained in the *NSF Grant Policy Manual (NSF 95-26)*, available from the NSF Web site or by subscription from the Superintendent of Documents, Government Printing Office, Washington, DC 20402. In the event that the submitting organization has never received an NSF award, it is recommended that appropriate administrative officials become familiar with the NSF policies and procedures contained in the *Grant Policy Manual*, sections 500–501.3. If a proposal from such an institution is recommended for an award, the NSF Division of Grants and Agreements will request certain required organizational, management, and financial information.

ADVICE TO PROPOSAL WRITERS

DUE staff often provide informal guidance to proposers. The advice most frequently sought has been collected in *A Guide for Proposal Writing (NSF 98-91)*. For examples of DUE-funded projects, refer to the DUE Project Information Resource System (see page 29).

PRELIMINARY PROPOSAL PREPARATION (applicable to ATE and CETP)

A. All preliminary proposals (except those for ATE Special Activities) **must include:**

1. Cover Sheet (NSF Form 1207, 10/98) completed and signed by the PI(s). Other institutional signatures are not required at the preliminary proposal stage.

2. Project Data Form (NSF Form 1295, 10/98). The information on this form will be used to direct the preliminary proposal to appropriate reviewers.

3. Project Summary. This should be a clear, concise, self-contained description of the proposed project and should not exceed 22 single-spaced lines.

4. Project Description, not to exceed 6 single-spaced pages. The format must be readily legible. Use no less than 2.5-cm margins, and a standard font with font size no smaller than 12 point. Print only on one side of the page.

The preliminary proposal should express the conceptual design of the full proposal. Sufficient detail must be provided so that reviewers can evaluate the potential success of the project. The Project Description must address:

- *Project Goal*—Briefly describe the need for the project and the current advances upon which it is based. Be specific concerning what is to be accomplished (deliverables), the current situation, the target audience, and the specific changes to be instituted by the end of the project.
- *Strategies*—Describe the means to be used for accomplishing the goal. Highlight the innovative aspects that are most likely to produce change on a national scale.
- *Personnel*—Identify the project leaders; briefly describe their roles, and their qualifications and credentials to undertake specific project tasks.
- *Evaluation and Dissemination*—Describe the criteria to be used to determine project success. Outline plans for evaluating and disseminating products or strategies.
- *Partnerships*—Identify the institutions and other alliances that will participate in the project, and briefly describe their roles. Describe existing partnerships.
- *Connections*—Identify and describe the nature of interactions with other NSF and other federal, state, local, or privately funded projects.
- *Strategies to Address Diversity*—Describe plans to increase diversity within the workforce and to increase effective dialogue among faculty, teachers, students, industrial participants, and others. Outline specific ways in which these plans will be accomplished.

5. A One-page Estimated Yearly Budget plus a one-page budget explanation that provides enough detail for reviewers

to understand how funds would be used. It is **not** necessary to use the NSF Budget Form 1030. However, the estimated budget should be broken out by project year and separated into categories for salaries, equipment, supplies, travel, other direct costs, and indirect costs (at a Federally approved rate), and within each category sufficient detail should be provided about the purpose and allocation of funds. Estimated contributions by other partners in the alliance should be indicated. Equipment funds must be matched by non-Federal funds equal to or greater than funds requested from NSF.

6. A Curriculum Vitae (maximum of two pages) for each of the principals involved in the project. The vitae should show the expertise necessary to conduct the project.

Do not include appendices or attachments such as letters of support, curriculum documentation, etc.

Submit ten (10) copies of the preliminary proposal, postmarked no later than midnight of the deadline date, to:

ALLIED TECHNOLOGY GROUP, INC.
NSF/DUE PROGRAM _____ [*either ATE or CETP*]
ANNOUNCEMENT NO 99-53
1803 RESEARCH BLVD., SUITE 601
ROCKVILLE, MD 20850

Preliminary proposals cannot be submitted via NSF's FastLane system.

A subset of applicants will be encouraged to submit formal proposals. The time between the deadline for submission of preliminary proposals and the reply from NSF will be approximately six weeks for CETP and ten weeks for ATE.

B. Preliminary Proposals for ATE Special Activities:

See the instructions in the ATE section under "f. Special Activities" on page 17.

FORMAL PROPOSAL PREPARATION

The formal proposal for all programs should contain the following information, assembled in the order indicated:

1. Cover Sheet (NSF Form 1207, 10/98)
2. Information about Principal Investigators (NSF Form 1225, 10/98)
3. Project Data Form (NSF Form 1295, 10/98)
4. Project Summary
5. Table of Contents (NSF Form 1359, 10/98)
6. Project Description, including Results from Prior NSF Support

7. References Cited
8. Biographical Sketches
9. Budget (NSF Form 1030, 10/98) and Budget Justification
10. Current and Pending Support (NSF Form 1239, 10/98)
11. Appendices (if any)

All forms are available in the *Proposal Forms Kit (PFK NSF 99-3)* or the *Grant Proposal Guide (GPG NSF 99-2)* except the Project Data Form (NSF Form 1295), which is included in this Program Announcement.

1. Cover Sheet

The Cover Sheet (NSF Form 1207, 10/98) should be fully completed with the information requested in the *GPG*. Most of the items are self-explanatory. **One copy must carry the original signature of the PI(s) and the Authorized Organizational Representative.**

Be sure to indicate both the program and track to which the proposal is being submitted. If a preliminary proposal was submitted, indicate the number that was assigned to it.

Note that if funds for this project are being requested from another Federal agency or another NSF program, this must be indicated on the cover sheet. If funds are requested after the proposal is submitted, send a letter so stating to DUE, identifying the proposal by its NSF number.

The Title should include informative key words that indicate, for example, the discipline, the target audience, and the nature of the problem or innovative solution.

2. Information about Principal Investigators

Submit a copy of NSF Form 1225 (10/98) for each PI and Co-PI. Attach the form(s) to the *original signature copy* of the proposal. Do not include the form(s) with any of the other copies of the proposal, since this would compromise the confidentiality of the information. Although providing the requested information is voluntary, **submitting this form is required by NSF**. Omitting this form will delay proposal processing.

3. Project Data Form

The information on the Project Data Form (NSF Form 1295) is used to direct the proposal to appropriate reviewers and to announce and advertise the nature of NSF-supported projects. See the instructions on pages 30-31 for completing this form. If the project intends to address women, underrepresented minorities, or persons with disabilities as an audience, the proposal should explicitly describe features

that will result in increased participation by, and success of, these groups. The numbers given concerning student impact should be as accurate as possible.

4. Project Summary

The Project Summary should be a clear, concise, self-contained description of the project that would result if the proposal is funded by NSF. It should be informative to other persons working in the same or related fields, and insofar as possible, understandable to a scientifically literate reader. It should not contain extraneous descriptions of the institution, department, or PIs. In no more than 22 single-spaced lines the summary should describe: the *problem(s)* being addressed by the proposal; the *objectives* and expected outcomes including products; the *activities* used to accomplish the objectives; and, as appropriate, what *special audiences* are targeted by the project; notable *collaborations* with other institutions; and which *DUE themes* apply (i.e. teacher preparation, diversity, faculty development, or integration of technology in education).

5. Table of Contents

6. Project Description, including Results from Prior NSF Support

Text in this section of a formal proposal should be **double-spaced** (3 lines per 2.5 cm). The format must be readily legible. Use no less than 2.5-cm margins, and a standard font with font size no smaller than 12 point. Print only on one side of the page. Obey the following page limits:

PROGRAM	PAGE LIMIT
CCLI Educational Materials Development:	
Proof-of Concept	15
Full-Scale Development	30
CCLI Adaptation & Implementation	15
CCLI National Dissemination	30
CETP Institutional Focus and System-wide Focus	30
ATE Projects and Centers	30

DUE will not accept proposals in which the Project Description (including Results from Prior NSF Support) exceeds these page limits.

This section of the proposal presents most of the information that determines whether or not the proposal will be recommended for an award. Write the proposal to respond to criteria, as described in this document, that will be used by reviewers in judging the merit of the proposal.

Results from Prior NSF Support

If the prospective PI or Co-PI(s) has received support from NSF **pertaining to undergraduate education** in the past

five years, briefly describe the earlier project(s) and outcomes or present progress. Do not list research funding unless those projects have a direct bearing on the new proposal. Provide sufficient detail to permit a reviewer to reach an informed conclusion regarding the value of the results achieved. Include the NSF award number, amount and period of support, the title of the project, a summary of the results of the completed work, and a list of publications and formal presentations that acknowledged the NSF award (do not submit copies with the proposal). **Be aware that, for any completed NSF-funded project, the PI must have submitted a Final Project Report, or no new grant can be awarded** (see page 29).

Project Description

This description of the project should contain:

a) Project Overview: Briefly summarize the project, clearly stating goals and objectives, planned activities, general organizational structure (highlighting major participants), general schedule for activities, and expected outcomes.

b) Goals and Objectives: Describe the goals clearly and concisely, relating them to local needs and resources within the context of national concerns and recent trends.

c) Detailed Project Plan: This should be the longest section of the Project Description. Describe the project's features, clearly delineating the need or problem you will address, what you plan to do, how you plan to do it, the timetable for executing the project, and the facilities and resources available for realizing the project's objectives.

Where appropriate, include evidence of past successes that supports the methods you plan to adopt; such evidence may come from the current literature or from pilot programs. The literature cited in the bibliography should reflect an understanding of the knowledge base in the field in which the problem or question is posed. **Appropriate literature on research in teaching and learning should be cited.** Any literature cited should be clearly and specifically related to the proposed project, and it should be clear to a reader how the information in a reference has played a role in the design of the project.

Describe as well the organizational structure of the project including any current barriers to inter-departmental or inter-institutional collaboration, as appropriate, and your plans to overcome these problems. Indicate how the project will be self-sustained at the conclusion of NSF support.

d) Experience and Capability of the Principal Investigator(s): Briefly describe the experience and capability of the PI(s). Include a brief description of the rationale for including the specific faculty members and

institutional components within the project. State the role of each and cite the expertise that each will contribute to the project.

e) Evaluation Plan (see also page 5): Describe the criteria that will be used to evaluate the quality and impact of the project, how student learning will be assessed to reflect the proposed educational objectives and practices, the process for collecting and analyzing information at the applicant's institution or from others involved in pilot testing of materials developed, and the use of the information for monitoring the progress of the project. Provide a timeline for the evaluation activities. Describe the qualifications of the individuals who will perform the evaluation tasks or serve on an advisory committee to provide general advice on the project's concept and conduct. The independence of such individuals from the PI should be evident. The breadth of the evaluation plan and the composition of an advisory committee should be appropriate to the size and complexity of the project.

For very large projects (generally those requesting \$500,000 or more), plans should include a National Visiting Committee (NVC). NVCs provide advice to the project staff, assess the plans and progress of projects through reports to the project leadership and to NSF, and enhance dissemination of the project's products. NSF will work with the proposer during the award process to finalize NVC membership and budget details.

f) Dissemination of Results (see also page 5): Describe plans to communicate the results of the project to other professionals in the SMET and education communities, both during and after the project, and to disseminate products. Designate the audience to be reached and describe the information or materials to be disseminated (e.g., textbooks, laboratory manuals, software, multimedia materials); how the material will be made available to other institutions; the means of dissemination (e.g., faculty development workshops, journal articles, conference presentations, electronic networks and media); the nature of technical assistance available to support implementation; and procedures for determining success of the dissemination effort. If significant use of information technology is proposed, describe the procedures to maintain the quality and currency of the material, to provide user support, to publicize the availability of materials, and to assess the impact of the project. Plans for involving commercial publishers in the production, marketing, and dissemination of all appropriate products should be provided.

Special instructions for equipment requests:

The equipment requested must be appropriate for the project's objectives. The Project Description must show how the proposed curriculum improvement will incorporate

the requested equipment, and how the equipment will be used to improve student learning. A proposal seeking support for equipment for several unrelated projects or for a list of equipment to be used in unrelated ways is not appropriate.

In addition to the material cited above under **c) Detailed Project Plan**, include:

1) Equipment Request: Here answer the question, "Is each item of requested equipment actually needed to implement this development, is it the right piece of equipment for the job, and is the request appropriate for the department?" Indicate briefly *how* each major equipment item requested will be used to enhance learning. Also indicate why the particular equipment was chosen, what alternatives were considered and rejected, and why. Reviewers do not need to be told what functions a given piece of equipment can perform unless those functions are unusual. Establish the precise correlation between the subject matter developments and the items of equipment being requested. In the event of an award, any items regarded by NSF as ineligible or inadequately justified will be deleted from the authorized list of purchases.

Specifically explain requests for 1) apparatus of a quality or cost not usually encountered in undergraduate instruction; 2) equipment which is to be fabricated rather than purchased as a unit; or 3) purchases which might appear to be at variance with the academic setting in which the project would operate. Justification of these items must be related to the improvement of undergraduate education. Arguments based on enhancement of graduate-level courses, improvement of faculty research capabilities, or other activities outside the scope of undergraduate education are inappropriate.

2) Equipment on Hand for the Project: Answer the question, "Has there been a thorough inventory of current equipment and does the project plan to make full use of this equipment?" Discuss major equipment on hand that will be available for the project, but that is not included in this request. Describe how the requested equipment will fit into the department's current holdings.

3) Implementation and Equipment Maintenance: Answer the question, "Is a reasonable plan presented to ensure a maximum usable lifetime for the equipment?" Briefly, but explicitly, outline the institution's plan for starting the project and for maintaining the equipment beyond the duration of the grant.

7. References Cited

Refer to *GPG* for guidelines.

8. Biographical Sketches

Provide a biographical sketch of **no more than two pages** for each person listed as Senior Personnel on the NSF Budget Form 1030. For CETP proposals, biographical sketches of other participants may be included but may not exceed one page per person. Refer to *GPG* for what information must be included within the two-page limit.

9. Budget and Budget Justification

See NSF Form 1030 (10/98) and the instructions in *GPG*, and those in this document under each program. Text for budget justification is limited to a total of no more than 3 single-spaced or 6 double-spaced pages for all budget years, except for the CETP System-wide Focus proposals, where the limits are 5 single-spaced or 10 double-spaced pages.

For all programs, it is expected that the majority of the funds requested be for personnel time and costs related to development and implementation of new courses and curricula, and/or equipment for laboratory improvement. For multi-institutional submissions, the budget explanation should include the contributions of each institution and the amount each will receive from the grant. For multi-year projects, the results of the project are expected to be integrated into the academic programs of the institutions within the period of the award, and therefore it is expected that the budgets will reflect the assumption of responsibility by the participating institution(s) as the educational innovations are fully implemented.

NSF funds may not be used to support expenditures that would have been undertaken in the absence of an award, such as the costs for routine teaching activities including curriculum development.

Institutional Matching Requirements

In all DUE programs, requests for equipment must be matched by funds or equipment from non-Federal sources equal to or greater in value than the funds requested from NSF. To qualify as matching, these resources must be used specifically for the equipment (or its equivalent) listed in the budget approved for the project. **For CCLI Adaptation & Implementation proposals only, the entire budget request must be matched by non-Federal resources equal to or greater in value than the funds requested from NSF.** The non-equipment portions of the budget may be matched in the form of funds, equipment, personnel time, etc., and may be provided from the institution(s), industry, foundations, or other non-Federal sources.

For the equipment match, an institution may obligate its matching funds or receive gifts of equipment to be counted toward matching at any time *following the program deadline*

date under which the awarded proposal was submitted, but before the grant expiration date specified in the grant document. This normally provides a lengthy period during which the institution must fulfill the requirement to match NSF equipment funds. For all other categories of matching (e.g., personnel time) an institution may obligate its matching funds at any time *following the award effective date* but before the grant expiration date specified in the grant document.

For all programs, **the cost-sharing amount must be entered on Line M of NSF Budget Form 1030.** Any cost-sharing commitments should be described in the budget justification detailing the funds requested from NSF, the non-Federal matching funds, and the total project costs. These cost-sharing commitments will be referenced and included as a condition of an award.

Workshops

In proposals that involve professional development workshops, it is generally expected that the home institutions of the faculty participants will bear the cost of travel to and from the workshop. However, on ATE proposals some travel costs for preK-12 teachers and college faculty may be included in project budgets. In CCLI-A&I proposals travel costs paid by the grantee institution may be counted towards the institutional match requirement.

In all DUE programs, the NSF grant may include participant support costs for subsistence (lodging and meals) during the workshop. In addition, funds may be requested for a stipend of up to \$60 per day of the workshop for participants. Requests for such stipends must be specific to the target audience and fully justified; for example, to assure participation by faculty with few professional development opportunities or from resource-poor institutions. No tuition or other fees may be charged to the participants. Note that indirect costs may not be charged on participant support costs. The host institution is expected to provide the facilities and equipment necessary to operate the project, and therefore NSF will ordinarily support no permanent equipment or facilities. The host institution is also expected to cover the expenses incurred by their own faculty participants.

With the exceptions noted above, the NSF grant may provide for planning and provision of the workshop, follow-through activities, participant support, and indirect costs. The total cost per participant-day varies considerably depending on the proposed activity.

Special instructions for equipment requests:

Preparation of Equipment Budget and Justification

a) Reviewers must be able to recognize the function of the requested equipment. Therefore, on a separate page list all

individual items by a descriptive name and the *probable* brand, model, and price. Such selections may be changed after an award.

b) Budget items may be either single items meeting the minimum cost required (\$500), or part(s) of a *functional unit* where the sum of the components meets the minimum cost requirement. A *functional unit* is an assemblage of instruments, modules, and components that together perform a specific task or that will normally be used together. Each component of a functional unit must be itemized and the cost indicated; the subtotal for the entire unit should be entered as the unit cost.

c) Many equipment manufacturers routinely offer educational or institutional discounts. In preparing the budget, contact manufacturers or distributors to obtain discounted prices. On the detailed equipment budget page show both the *list price* and the *discounted price* used to compute the total cost of the project. If it is possible to negotiate on an individual basis a special discount not routinely available to educational institutions, list the usual discounted price in the project's budget. The amount by which the special discount exceeds the standard educational discount may be counted as matching funds.

Eligible Equipment Items

For proposals submitted to DUE programs, each item or functional unit of equipment must have a minimum unit acquisition cost of \$500 and an expected service life of more than one year.

a) *Scientific and computing equipment*, to be used in any phase of undergraduate SMET education, may be requested. The equipment must be for use in specific curricular improvements discussed in the Project Description. Purchase of software essential to the scientific, technical, and educational objectives of the project is permitted. Each software package must be itemized, justified, and the cost indicated. Software ordered in conjunction with new computing equipment is regarded as part of a functional unit and, accordingly, need not cost \$500 in order to be eligible.

Construction of equipment, including material and labor costs, is allowed. Sufficient justification must accompany requests for equipment construction funds, such as a detailed explanation of the advantages of the proposed units over commercially available items. Requests for equipment fabrication must be supported by drawings, diagrams, parts lists, and estimates for labor charges, as appropriate. Any use of project funds (NSF or institutional matching funds) for the modification or construction of laboratories or other buildings, or for the installation of equipment, is specifically prohibited.

Equipment assembly costs for on-site assembly of multi-component instruments, as distinct from equipment instal-

lation or building or laboratory modification, are allowable. Specialized safety equipment may be purchased where necessary for the safe utilization of the equipment requested.

b) *Shipping costs*, if not included in the purchase price, should be separately itemized. Reasonable estimates should be used, as opposed to a percentage of equipment costs.

c) *Required taxes* may be included if the institution cannot be exempted from paying them.

Ineligible Equipment Items

In any DUE project, neither NSF funds nor institutional matching funds may be used to purchase:

- teaching aids (e.g., films, slides, projectors, “drill and practice” software), word-processing equipment, library reference materials, or expendables (e.g., glassware, chemicals);
- instrumentation that is not mainly for undergraduate use;
- vehicles, laboratory furnishings or general utility items such as office equipment, benches, tables, desks, chairs, storage cases, routine supplies, and general consumables;
- maintenance equipment and maintenance or service contracts—even when these are for equipment procured through a DUE program;
- building or laboratory modifications or construction required for installation of the equipment (as distinct from simply integrating multiple computational resources or interfacing computers to instruments);
- a flat percentage inflation allowance;
- replacement equipment that does not significantly improve instructional capability.

10. Current and Pending Support

All external support to the PI(s), including the proposed project, must be listed on NSF Form 1239. This information is needed to ensure that project leaders will have time to conduct the project and there is no duplication of support.

11. Appendices

For all programs:

Appendices should be relevant and concise. For materials development proposals, a sample of prior work or work in progress is recommended.

For CETP proposals:

Letters of support from the President, Dean of Arts and Sciences or Engineering, and Dean of the School of Education from the submitting institution are **required**. These letters should cite specific policies and activities they will pursue: to recognize the importance of the project to the

campus; to encourage faculty and departments to participate in the project (e.g., reward and recognition for grant-related efforts including full credit for education related publications); to enable faculty and departments to implement project goals (e.g. needed renovation of learning spaces, support for faculty to attend workshops, support for data gathering through the registrar); and to establish increased institutional recognition of the importance of SMET department participation in teacher preparation in partnership with education departments and school districts. The total number of pages in the combined appendices may not exceed 15 single-spaced or 30 double-spaced pages, including any letters of support from participating institutions or individuals.

Note: At present, NSF’s FastLane system makes no explicit provision for submitting appendices. Proposers using FastLane have two options: (1) They may mail the required number of copies of appendices (10 copies for ATE and CCLI proposals; 15 copies for CETP proposals) along with the signed Cover Sheet and the Project Data Form (see below). (2) If proposers have appendices in electronic format (e.g., as word-processed documents), they *may* include them as part of the “Project Description” in FastLane; in this case, the appendix or appendices should begin on a new page (following the Project Description proper) and should be clearly labeled “Appendix” or “Appendix A,” “Appendix B,” etc. For proposers who choose Option (2), the added appendix pages will not count against the page limits for the Project Description.

PROPOSAL SUBMISSION

FastLane Submission:

DUE now requires use of the NSF FastLane system for some proposal submission functions; see page iii for details. For proposals submitted via FastLane, the signed Cover Sheet, the Project Data Form, and multiple copies of Appendices (see “Note” above) should be mailed to the address for paper submissions below and received within five working days following the FastLane proposal submission. (For DUE programs, do not mail the Cover Sheet, etc., to the NSF address specified for electronic submissions in the *GPG*, Chapter I, Paragraph F.)

Paper Submission:

For paper submissions, the required materials should be postmarked no later than the program deadline date and sent in a *single* package to:

ALLIED TECHNOLOGY GROUP, INC.
NSF/DUE _____ [enter Program and Track]
ANNOUNCEMENT NO. 99-53
1803 RESEARCH BLVD., SUITE 601
ROCKVILLE, MD 20850

The following materials must be included in the submission:

- The original copy of the proposal, including (a) the Cover Sheet bearing the original signatures of the PI, co-PI(s) and Authorized Organizational Representative, and (b) one copy of NSF Form 1225 for each PI and co-PI.
- For CETP: fourteen (14) additional copies of the proposal. For all other programs: nine (9) additional copies. In these copies, omit the NSF Form(s) 1225, because including this form could compromise the confidentiality of the information.

The following requirements also must be met:

- All submitted materials must be contained in a single package. Secure packaging is mandatory. NSF is not responsible for processing proposals damaged in transit.
- Each copy of the proposal should be on standard size paper of regular weight. All Project Description and Appendix pages must be numbered. The duplicating process should ensure legibility for at least 5 years.

Don'ts:

- *Do not* send separate “information” copies or several packages containing parts of a single proposal.
- *Do not* send videotapes, computer diskettes, CD-ROMs, slides, books, etc.

Proposal Review Information

I. NSF Merit Review Criteria

Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers. Special care is taken to ensure that reviewers have no immediate and obvious conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority serving institutions, adjacent disciplines to that principally addressed in the proposal, etc.

A. General Review Criteria

Proposals will be reviewed against the following general merit review criteria established by the National Science Board. Following each criterion are potential considerations that the reviewer may employ in the evaluation. These are suggestions and not all will apply to any given proposal. Each reviewer will be asked to address only those that are relevant to the proposal and for which he/she is qualified to make judgments.

What is the intellectual merit of the proposed activity?

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

What are the broader impacts of the proposed activity?

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

B. Additional Factors

Integration of Research and Education

One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and

where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learner perspectives. PIs should address this issue in their proposal to provide reviewers with the information necessary to respond fully to both NSF merit review criteria. NSF staff will give it careful consideration in making funding decisions.

Integrating Diversity into NSF Programs, Projects, and Activities

Broadening opportunities and enabling the participation of all citizens—women and men, underrepresented minorities, and persons with disabilities—is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports. PIs should address this issue in their proposal to provide reviewers with the information necessary to respond fully to both NSF merit review criteria. NSF staff will give it careful consideration in making funding decisions.

II. Review Considerations Specific to DUE Programs

The majority of proposals submitted to DUE are considered by panels of peer reviewers. Each panelist reads and writes an individual review for all proposals assigned to the panel. The panel then convenes as a group to discuss the proposals. Following these discussions, panelists complete their individual reviews and one panel member writes a summary of the discussion for each proposal. Reviews are used by NSF Program Officers to inform funding decisions, and anonymous copies are sent to all proposers.

With regard to DUE's programs, NSF's two general merit review criteria lead to questions such as the following, which are often raised in the review process.

Intellectual merit:

- Does the proposed project address a major challenge facing undergraduate SMET education?
- Does the project have potential for improving student learning of important SMET principles?
- Are the goals and objectives, and the plans and procedures for achieving them, worthwhile, well-developed, and realistic?
- Is the rationale for selecting particular activities or components for development or adaptation clearly articulated?
- Does the project design consider the background, preparation, and experience of the target audience?
- Is the project informed by research in teaching and learning, current pedagogical issues, the efforts of others, and relevant literature?

- Does the project provide for effective assessment of student learning, which reflects the proposed educational objectives and practices?
- Are plans for evaluation of the project appropriate and adequate for the project's size and scope and will the evaluation appropriately inform project development?
- Does the project have the potential to provide fundamental improvements in teaching and learning through effective uses of technology?
- Is the project led by and supported by the involvement of capable faculty (and where appropriate, practicing scientists, mathematicians, engineers, technicians, teachers, and student assistants), who have recent and relevant experience in education, in research, or in the workplace?
- Is the project supported by adequate facilities, resources, and departmental commitment?
- Is the evidence of institutional support clear and compelling?

Additional questions relevant to CETP proposals:

- Will the project prepare preK-12 teachers who are knowledgeable in science, mathematics, and technology; confident in their abilities in these disciplines; and able to effectively use a variety of pedagogical approaches and technology to improve student learning?
- Is there evidence of collaboration among faculty and departments in the sciences, mathematics, engineering, technology and education, with demonstrated leadership from the SMET faculty?
- For multi-institutional projects, is there significant evidence of collaboration with and commitment by the partner institutions including school personnel (teachers, supervisors, administrators) in proposal preparation and in the planning and implementation of the project?
- Does the project include the integration of mathematics and science, effective use of technologies, applications to engineering and technology, or new methods of student assessment appropriate to the educational methodologies?
- Does the proposal indicate how the project relates to an existing teacher preparation program? Is there significant redesign of activities, including disciplinary courses, which serve prospective teachers as part of the audience, and are these activities integrated into the curriculum and institutional requirements?
- Does the project contain exemplary mentoring and field experiences (e.g., student teaching, laboratory research opportunities, support for novice teachers)?
- Are there strategies for recruiting, supporting, and graduating high-quality prospective mathematics and science teachers, particularly from underrepresented groups including persons with disabilities?

Broader impacts:

- Are the proposed activities integrated into the institution's academic program?
- To what extent will the results of the project contribute to the knowledge base of activities that enhance student learning?
- Will the project evaluation inform others through the communication of results?
- Are the results of the project likely to be useful at similar institutions?
- What is the potential for the project to produce widely used products which can be disseminated through commercial or other channels?
- Are plans for producing, marketing and distributing these products appropriate and adequate?
- For ATE projects, does the project address the current and future needs of industry for technicians? Does the project enhance the status of technician education?
- Will the project result in significantly improved content and pedagogical preparation of faculty and teachers of science, mathematics, engineering, and technology?
- Does the project effectively address one or more of the following objectives:
 - ensure the highest quality education for those students planning to pursue SMET careers?
 - increase the participation of women, underrepresented minorities, and persons with disabilities?
 - provide a foundation for scientific, technological, and workplace literacy?
 - develop multi- and interdisciplinary courses and curricula?
 - develop courses and curricula that are aligned with national standards, as appropriate?

Additional questions relevant to CETP proposals:

- Is there evidence that programs initiated by the Collaborative will become established within the participating departments and sponsoring institution(s)?
- Will the project result in increased involvement of mathematics, science and, as appropriate, engineering and technology departments and their faculty in the preparation of prospective teachers?
- Are adequate systems provided to collect baseline and subsequent data to measure program impact?
- Is there cooperation with other programs in the region designed to improve the teaching of mathematics and science (e.g., LSC, SSI, USI, RSI, AMP, large systemic efforts in preK-12 curriculum reform)?
- Are there effective mechanisms included to promote the incorporation of successful models or results into state-wide practice and policy?
- Are there creative plans to maintain continuing relationships with graduates of the proposed program to encourage their retention in science and mathematics teaching?

Announcement and Administration of Awards

ANNOUNCEMENT

The review and processing of proposals will require approximately six months. Decisions will be announced individually through written notices to the institution and to the Principal Investigator (PI). **Proposers are strongly encouraged to consult the FastLane system for the most up-to-date information about their proposals.** Decisions on awards will be announced as soon as they are made, not simultaneously. Thus, it is normal for some proposers to receive a decision earlier than others. The number of awards will depend on the quality of the proposals received and the availability of funds.

ADMINISTRATION OF AWARDS

Awards will be administered in accordance with the terms and conditions of the latest editions of NSF GC-1, "Grant General Conditions," or FDP-III (Federal Demonstration Project). Additional information can be found in the *Grant Proposal Guide (GPG, NSF 99-2)*. More comprehensive information is contained in the *NSF Grant Policy Manual (GPM, NSF 95-26)*. Answers to Frequently Asked Questions regarding grant administration activities, and the publications mentioned above, are available at the Division of Grants and Agreements Web site <<http://www.nsf.gov/bfa/dga/>>.

Responsibility for Results and Their Dissemination

NSF does not assume responsibility for project results or their interpretation. The grantee institution is wholly responsible for the conduct of the project and for preparation of the results for publication. However, NSF strongly encourages dissemination of the results of the projects it funds, as discussed on page 5.

If it is anticipated that a project will result in commercial publication or distribution of materials developed under a resulting NSF supported award, grantees are responsible for developing publication plans and approving publication and distribution contracts and other agreements. The grantee must maintain written justification and documentation to support such plans and arrangements.

At a minimum, the grantee's publication/distribution plan should address the following:

- a) identification and brief description of materials, proposed media and format, objectives of the materials, intended educational levels and expected market,

expected market life, expected need for revisions, existing or proposed materials with which they might compete;

- b) expected interest by commercial publisher(s)/distributor(s) and explanation;
- c) alternative publication/distribution arrangements being considered and advantages/disadvantages of each;
- d) procedures to be followed for the competitive selection of publisher(s)/distributor(s), or justification for non-competitive selection; including a description of the means for publicizing the opportunity for publisher(s)/distributor(s) to submit proposals, and for disseminating the solicitations and a list of publisher(s)/distributor(s) to be solicited directly.

The grantee shall maintain standards of conduct comparable to those described in OMB Circular A-110.42 that shall govern the performance of its officers, employees or agents engaged in the awarding and administration of contracts or licenses for the publication and distribution of materials developed under an NSF award.

All publication/distribution agreements should include provisions 1) providing the Government with a royalty-free license to use the materials for Government purposes; 2) granting the Government the right to examine, audit and copy publisher's/distributor's records relative to NSF support.

Income generated as a result of commercial publication or distribution of NSF-supported materials shall be used in accordance with guidance provided in Section 750 of the *Grant Policy Manual* unless stated otherwise in the award letter. The grantee is required to retain appropriate financial and other records relating to project income earned during the grant period and for three years beyond the end of the grant period.

The following acknowledgment of NSF support must appear in publications (including Web pages) of any material, whether copyrighted or not, based on or developed under NSF-supported projects:

This material is based upon work supported by the National Science Foundation under Grant No. DUE-XXXXXXX.

Except for articles or papers published in scientific, technical, or professional journals, the following disclaimer should be included:

Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

Annual Progress and Final Project Reports

For all multi-year grants an Annual Progress Report is due at least 90 days before the end of the current budget period. For details, refer to *GPG*, Chapter VII-Section G.

Within 90 days after the expiration of a grant (including any automatic or other extensions), the PI is required to submit a Final Project Report. Applicants should review the requested information prior to proposal submission so that appropriate tracking mechanisms are included in the proposal plan to ensure that complete information will be available at the conclusion of the project. **Failure to provide Final Project Reports will delay NSF review and processing of pending proposals for the project PI and Co-PIs.**

A new format for the annual and final report is now required (effective October 1, 1998). While PIs are *strongly encouraged* to submit the reports via the FastLane system, NSF will not *require* electronic submission before October 1999. Paper copies of the report formats may be obtained from: NSF Clearinghouse, PO Box 218, Jessup, MD 20794-0218.

Quarterly and final expenditure information is provided by most grantee institutions through the Federal Cash Transactions Report (SF 272), normally submitted by the grantee's financial officer.

DUE Project Information Resource System

Awardees are asked to update information regarding their project through DUE's Project Information Resource System (PIRS), located at the Web site <<http://www.ehr.nsf.gov/PIRstart/>>. A primary purpose of PIRS is to provide information to the community. Project information can be provided by PIs at any time to reflect ongoing developments. The NSF Final Project Report is a separate reporting requirement that must be completed as indicated above; however, PIRS and NSF's FastLane Final Project Report process will be linked to reduce redundancy in reporting.

Change in Principal Investigator (PI)

If a PI or Co-PI leaves a project before its completion, the grantee institution must explain the circumstances and nominate a suitable replacement in a letter to the NSF

Program Officer named in the grant letter. This letter should include the nominee's qualifications, biographical sketch including the nominee's Social Security number, and statement of the nominee's current and pending support (NSF Form 1239), and must be signed both by the nominee and by an Authorized Organizational Representative. The appointment of a new PI or Co-PI is not effective until approved by the NSF via an amendment to the grant.

No-Cost Extension

a. Notifications of Grantee-Authorized Extensions

Grantees may authorize a one-time extension of the expiration date of the grant of up to 12 months if additional time beyond the established expiration date is required to assure adequate completion of the original scope of work within the funds already made available. This one-time extension may not be exercised merely for the purpose of using unspent balances. The grantee shall notify NSF, providing reasons for the extension and the revised extension date, **at least ten days prior** to the expiration date specified in the grant to ensure accuracy of NSF's grant data. For grantee-authorized extensions, no amendment will be issued by NSF. **DUE requires that grantee-authorized no-cost extension notifications be submitted via the FastLane system.**

b. Requests for NSF-Approved Extensions

If additional time **beyond** the extension provided by the grantee is required and exceptional circumstances warrant, a formal request must be submitted to NSF for approval **at least 45 days before** the expiration date of the grant. **DUE requires that requests for NSF-approved no-cost extensions be submitted via the FastLane system.** The request must explain the need for the extension and include an estimate of the unobligated funds remaining and a plan for their use. As indicated above, that unobligated funds may remain at the expiration of the grant is not in itself sufficient justification for an extension. The plan must adhere to the previously approved objectives of the project.

Any NSF-approved no-cost extension will be issued by an NSF Grants Officer in the form of an amendment to the grant specifying a new expiration date. Grantees are cautioned not to make new commitments to incur new expenditures after the expiration date in anticipation of a no-cost extension.

Instructions and Codes for Completing NSF Form 1295: Project Data Form

Item 1 Indicate the **program-track** to which the proposal is being submitted:

- CCLI: Course, Curriculum, and Laboratory Improvement
CCLI-EMD Educational Materials Development
CCLI-A&I Adaptation and Implementation
CCLI-ND National Dissemination
- CETP: NSF Collaboratives for Excellence in Teacher Preparation
CETP-IF Collaborative: Institutional Focus
CETP-SF Collaborative: System-wide Focus
- ATE: Advanced Technological Education
ATE-PR Project
ATE-CE Center of Excellence

Item 2 Enter the **Name of the Principal Investigator/Project Director**.

Item 3 Enter the **Name of the Submitting Institution**, including the branch or campus.

Item 4 List any **Other Institutions Involved**: directly, through subcontracts, or through shared use of equipment.

Code A Select a two-digit **Discipline Code** that is most descriptive of the general area for your proposal.

11	ASTRONOMY	51	ENGINEERING	71	SOCIAL, BEHAVIORAL, & ECONOMIC SCIENCES
61	BIOLOGICAL SCIENCES	53	Aeronautical Engineering	72	Biological Psychology
12	CHEMISTRY	54	Chemical Engineering	73	Social Psychology
		55	Civil Engineering	81	Cognitive Psychology
		56	Electrical Engineering	82	Anthropology
		57	Mechanical Engineering	83	Economics
	COMPUTING	58	Materials Science & Engineering	84	History
31	Computer Science	59	Engineering Technology	85	Linguistics
32	Computer Engineering		Engineering—Other; includes	86	Political Science
33	Information Science and Systems		Agricultural; Bioengineering; Industrial	88	Sociology
34	Software Engineering		& Management; Nuclear; Ocean;	89	Geography
35	Computing—Other; includes		Manufacturing; Systems Engineering;	91	Social Sciences—Other
	Computational Science & Systems.		and Inter- or Multi-disciplinary projects		Science & Technology Assessments;
	Note: Computer applications should		involving Engineering disciplines only.		Effects of Sciences & Technology on
	be coded under specific disciplines.	99			Society; Ethical Considerations;
			INTERDISCIPLINARY /		Science Policy
	EARTH SCIENCES		MULTIDISCIPLINARY		
40	Earth Systems Science	21	MATHEMATICAL SCIENCES		
41	Atmospheric Sciences				
42	Geology	13	PHYSICS		
43	Oceanography				

Code B Enter the **Academic Focus Level Code** of the project. That is, the project will develop, implement, or disseminate curricular or laboratory material for eventual presentation at what academic level: **LO** = lower division undergraduate courses; **UP** = upper division undergraduate courses; **BO** = both divisions of undergraduate courses; **PC** = pre-college courses (preK-12); **AL** = pre-college and undergraduate courses.

Code C Enter the **Highest Degree Code** to indicate the highest degree offered in science, mathematics, or engineering by any department on the campus submitting this proposal: (**A** = Associate; **B** = Baccalaureate; **M** = Masters; **D** = Doctorate; **N** = Non-academic institution).

Code D Enter the proper **Category Code** depending on the program:
CCLI: Indicate whether the project scope is at the **X** = EMD “proof-of-concept” or A&I single course/lab level; or at the **Y** = EMD full development or A&I comprehensive curriculum level. For CCLI-ND proposals, leave blank.
CETP: Indicate whether the project focuses on preparing **ET** = elementary school teachers; **MS** = middle school teachers; **SS** = secondary school teachers; or is **CM** = comprehensive.
ATE: Indicate whether the project focuses on **A** = adaptation and implementation, **B** = curriculum and educational materials development, **C** = teacher and faculty preparation and enhancement, **D** = technical experiences, **E** = laboratory improvement, or **F** = special activities

Code E If the project has major participation by the private sector (commercial or industrial organizations), indicate by entering **PS**; otherwise leave blank.

Code F For those proposals where a **significant** component of the project is the education of the following groups, indicate the proper **Audience Code(s)**. *Each group indicated must be discussed explicitly and substantively in the Project Description.* Codes: **W** = Women; **M** = Minorities; **D** = Persons with Disabilities; **H** = Technicians and Technologists; **T** = Pre-Service Teachers; **I** = In-Service Teachers; **S** = Secondary School Students; **F** = Faculty Professional Development

Code G Enter the **Institution Control Code** to indicate whether the performing institution is: **PUBL** = Public; **PRIV** = Private; **CONS** = Consortium; **NACD** = Non-academic.

Code H If applicable, indicate that the project has a **Strategic Area** focus by entering an appropriate code according to the following: **GC** = Global Change; **HPC** = High Performance Computing; **EN** = Environment; **MA** = Manufacturing; **BT** = Biotechnology; **AMP** = Advanced Materials and Processing; **CI** = Civil Infrastructure Systems; **KDI** = Knowledge and Distributed Intelligence.

Code I If applicable, indicate whether the project involves any of the following activities. Include up to **five** of the following **Project Features**:

- 1 = Research on Teaching and Learning
- 2 = Integration of Research and Education (e.g., direct undergraduate student research; research processes and/or data integrated into coursework; sharing research results via training courses for faculty, teachers, or industry groups; and encouraging greater balance in faculty teaching and research activities by altering rewards, review policies, and resources)
- 3 = Educational Uses of Technology (e.g., computers, portable instrumentation, distance learning, e-mail and other electronic communication, etc.)
- 4 = Field Experiences (i.e., outside the classroom)
- 5 = Connections with Business and Industry
- 6 = Science Literacy for Non-SMET Majors
- 7 = International Activities

Codes J-M

Give your best estimate of the numbers of persons in the indicated categories who will receive immediate benefit from the project (primary effect) and are likely to immediately benefit as a result of another person’s participation (secondary effect) during the period the project is in operation (including intermediate periods for seasonal projects).

NATIONAL SCIENCE FOUNDATION

Division of Undergraduate Education

NSF FORM 1295: PROJECT DATA FORM

Refer to the accompanying instructions and codes to be used in completing this form.

1. **Program-track** to which the proposal is submitted: _____
2. Name of **Principal Investigator/Project Director** (as shown on the Cover Sheet):

3. Name of submitting **Institution** (as shown on Cover Sheet):

4. **Other Institutions** involved in the project's operation:

Project Data:

- A. Major Discipline Code: __ __
- B. Academic Focus Level of Project: __ __
- C. Highest Degree Code: __ __
- D. Category Code: __ __
- E. Business/Industry Participation Code: __ __
- F. Audience Code: __ __ __ __
- G. Institution Control Code: __ __ __ __
- H. Strategic Area Code: __ __ __
- I. Project Features: __ __ __ __ __

Estimated number in each of the following categories to be directly affected by the activities of the project during its operation:

- J. Undergraduate Students: _____
- K. Pre-college Students: _____
- L. College Faculty: _____
- M. Pre-college Teachers: _____

Notices from the National Science Foundation

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Grantees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities, and persons with disabilities to compete fully in its programs. In accordance with federal statutes, regulations, and NSF policies, no person on grounds of race, color, age, sex, national origin, or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF (unless otherwise specified in the eligibility requirements for a particular program).

Facilitation Awards for Scientists and Engineers with Disabilities (FASSED) provide funding for special assistance or equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the program announcement or contact the program coordinator at (703) 306-1636.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation regarding NSF programs, employment, or general information. TDD may be accessed at (703) 306-0090 or through FIRS on 1-800-877-8339.

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the review process; to applicant institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies needing information as part of the review process or in order to coordinate programs; and to another Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information about PIs may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Reports Clearance Officer; Information Dissemination Branch, DAS; National Science Foundation; Arlington, VA 22230.

YEAR 2000 REMINDER

In accordance with Important Notice No. 120 dated June 27, 1997, Subject: Year 2000 Computer Problem, NSF awardees are reminded of their responsibility to take appropriate actions to ensure that the NSF activity being supported is not adversely affected by the Year 2000 problem. Potentially affected items include: computer systems, databases, and equipment. The National Science Foundation should be notified if an awardee concludes that the Year 2000 will have a significant impact on its ability to carry out an NSF funded activity. Information concerning Year 2000 activities can be found on the NSF web site at <http://www.nsf.gov/oirm/y2k/start.htm>.

NATIONAL SCIENCE FOUNDATION
ARLINGTON, VA 22230

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RETURN THIS COVER SHEET TO ROOM P35 IF YOU DO NOT WISH TO RECEIVE THIS MATERIAL, OR IF A CHANGE OF ADDRESS IS NEEDED. INDICATE THE CHANGES, INCLUDING ZIP CODE, ON THE LABEL (DO NOT REMOVE LABEL).

OMB 3145-0058

NSF 99-53
(Replaces NSF 98-45)