

**INSTRUCTION, RESEARCH, AND STUDENT AFFAIRS**  
**JUNE 20, 2013**

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<b>TAB</b>	<b>DESCRIPTION</b>	<b>ACTION</b>
<b>1</b>	<b>BOISE STATE UNIVERSITY – SELF-SUPPORT, GRADUATE CERTIFICATE, MATHEMATICS CONSULTING TEACHER ENDORSEMENT</b>	Approval Item
<b>2</b>	<b>NORTH IDAHO COLLEGE – AEROSPACE TECHNOLOGY PROGRAM</b>	Approval Item
<b>3</b>	<b>V.M. INTELLECTUAL PROPERTY POLICY – SECOND READING</b>	Approval Item

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**BOISE STATE UNIVERSITY**

**SUBJECT**

Approval of New Self-support Mathematics Consulting Teacher Endorsement Graduate Certificate

**APPLICABLE STATUTE, RULE, OR POLICY**

Idaho State Board of Education Governing Policies & Procedures, Section III.G. 4 and 5

**BACKGROUND/DISCUSSION**

Boise State University (BSU) proposes to create a new self-support program that will prepare students for a Mathematics Consulting Teacher Endorsement (MCTE). The Graduate Certificate is intended for individuals who want to develop the professional skills and knowledge to successfully work with teachers and students in developing mathematical understanding. Successful graduates will be recommended to the Idaho State Department of Education for the Mathematics Consulting Teacher Endorsement.

The proposed program has its origins in the Initiative for Developing Mathematical Thinking (IDMT) at BSU, which is funded through multiple state and federal grants and is charged with providing professional development to in-service teachers across Idaho. BSU has worked with the State Department of Education to provide a mandated 3-credit professional development course entitled Mathematical Thinking for Instruction to K-12 teachers and administrators across the state. Thus far, the course has been taken by over 10,000 teachers and administrators.

BSU's offering of the Mathematical Thinking for Instruction course has raised interest in further opportunities in mathematics education. As a next step, BSU worked closely with the Idaho State Department of Education to develop the proposed graduate certificate. The graduate certificate will provide existing teachers with the skills and knowledge for improving their mathematics instruction. The certificate program will also provide schools and districts with individuals who have received high quality professional development and mentoring in order to assist others in this work.

The design of the Graduate Certificate program is the result of specific requests from teachers, schools, districts and the State Department of Education to meet the need to have highly trained individuals that can assist in the implementation and continued support around the Idaho Core State Content standards for mathematics. Those standards were approved by the Board in 2010 and are scheduled for implementation in Fall of 2013. The new associated assessments from the Smarter Balanced Assessment Consortium are scheduled to begin in Spring of 2015. Educators in Idaho and across the nation need assistance in

**INSTRUCTION, RESEARCH AND STUDENT AFFAIRS**  
**JUNE 20, 2013**

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shifting mathematics instructional practice to meet the demands of the new standards and assessments.

To be eligible for the Mathematics Consulting Teacher Endorsement, individuals must demonstrate the competencies specified in the institutional recommendation form required by the Idaho State Department of Education. BSU worked with the Idaho State Department of Education to create a draft competency checklist.

**IMPACT**

BSU plans to charge \$225 per credit hour taken. In the second year of the program (when the program is fully functional), BSU will teach a total of 10 courses of 3 credits each with an estimate of 18-20 students per class once the program is fully implemented. BSU expects approximately 188 graduate student class registrations per year. This will produce 564 graduate student credit hours for a total gross income of \$126,900.

**ATTACHMENTS**

Attachment 1 – Proposal

Page 5

**STAFF COMMENTS AND RECOMMENDATIONS**

Boise State University (BSU) proposes to offer a new graduate certificate, Mathematics Consulting Teacher Endorsement (MCTE) that will begin Fall 2013 if approved. Students will be required to complete 21 credits of graduate coursework and demonstrate specific competencies in areas required by the State Department of Education in order to be recommended for the endorsement. BSU projects they will enroll 27 students in the program in the first year of the program offering.

BSU's request to create a new Graduate Certificate, Mathematics Consulting Teacher Endorsement is consistent with their Service Region Program Responsibilities. While the proposed endorsement is not listed on the current approved Five-Year Plan, BSU has demonstrated the immediate need for the endorsement and has added the program to their Plan. Institutions are currently working on updates to their five-year plans, which are scheduled for presentation to the Board in August 2013. Pursuant to Board Policy III.Z, no institution has the Statewide Program Responsibility for Education. All four-year postsecondary institutions in Idaho offer teacher education programs; however, no other state institution currently offers this endorsement program.

The proposed program has gone through the program review process and the Council on Academic Affairs and Programs (CAAP) supported the program on April 30, 2013.

The Standards Committee of the Professional Standards Commission (PSC) conducted a New Program Approval Desk Review of endorsement program and

**INSTRUCTION, RESEARCH AND STUDENT AFFAIRS**  
**JUNE 20, 2013**

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determined that the program met all of the requirements. At PSC's February 2012 meeting, the PSC voted to recommend Conditional Approval of the proposed Mathematics Consulting Teacher Endorsement program.

BSU also requests approval to assess a self-support fee consistent with Board Policy V.R.3.b.(v). Based on the information for self-support fees provided in the proposal, staff finds that the criteria have been met for this program.

CAAP and Board staff recommends approval of the proposed endorsement as presented.

**BOARD ACTION**

I move to approve the request by Boise State University to create a new self-support Graduate Certificate leading to the Mathematics Consulting Teacher Endorsement.

Moved by \_\_\_\_\_ Seconded by \_\_\_\_\_ Carried Yes \_\_\_\_\_ No \_\_\_\_\_

I move to approve the request by Boise State University to designate a self-support fee for the Graduate Certificate leading to the Mathematics Consulting Teacher Endorsement in conformance with the program budget submitted to the Board in Attachment 1.

Moved by \_\_\_\_\_ Seconded by \_\_\_\_\_ Carried Yes \_\_\_\_\_ No \_\_\_\_\_

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# Idaho State Board of Education

## Proposal for Graduate and Doctoral Degree Program

Date of Proposal Submission:	<del>February 10, 2013</del> <b>March 14</b>
Institution Submitting Proposal:	Boise State University
Name of College, School, or Division:	College of Education
Name of Department(s) or Area(s):	Department of Curriculum, Instruction, and Foundational Studies

**Program Identification for Proposed New, Modified, or Discontinued Program:**

Title:	Mathematics Consulting Teacher Endorsement		
Degree:	Graduate Certificate		
Method of Delivery:	Face to face		
CIP code (consult IR /Registrar)	13.1311		
Proposed Starting Date:	Fall 2013		
Indicate if the program is:	x	<u>Regional Responsibility</u>	Statewide Responsibility

**Indicate whether this request is either of the following:**

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> New Graduate Program<br><b>Graduate Certificate</b> | <input type="checkbox"/> Contract Program/Collaborative                           |
| <input type="checkbox"/> New Doctoral Program   | <input type="checkbox"/> Expansion of an Existing Graduate/Doctoral Program       |
| <input type="checkbox"/> New Off-Campus Graduate Program                                | <input type="checkbox"/> Consolidation of an Existing Graduate/Doctoral Program   |
| <input type="checkbox"/> New Off-Campus Doctoral Program                                | <input type="checkbox"/> Discontinuation of an existing Graduate/Doctoral Program |

Deane Brath  
College Dean (Institution)

3/14/13  
Date

Vice President for Research (as applicable)

Date

John R. Pelton / Theresa White  
Graduate Dean / ExtStudies Dean  
(For Grad Progs / Self-spprt &/or online)

Date

Patty Sanchez  
Academic Affairs Program Manager

Date

Steve Peck  
Chief Fiscal Officer (Institution)

3/10/13  
Date

Patty Sanchez, Program Mgr  
Chief Academic Officer, OSBE

4/30/13  
Date

M. E. ...  
Chief Academic Officer  
(Institution)

3/7/13  
Date

SBOE/OSBE Approval

Date

Robert ...  
President

3/14/13  
Date

March 16, 2012

Page 1

**Before completing this form, refer to Board Policy Section III.G., Program Approval and Discontinuance.** This proposal form must be completed for the creation of each new program and each program discontinuation. All questions must be answered.

- 1. Describe the nature of the request.** Will this program be related or tied to other programs on campus? Please identify any existing program, option that this program will replace. *If this is request to discontinue an existing program, provide the rationale for the discontinuance. Indicate the year and semester in which the last cohort of students was admitted and the final term the college will offer the program. Describe the teach-out plans for continuing students.*

The Department of Curriculum, Instruction, and Foundational Studies (CIFS) at Boise State University (BSU) requests approval of a self-support graduate certificate program to prepare students for a Mathematics Consulting Teacher Endorsement (MCTE). The Initiative for Developing Mathematical Thinking (IDMT) at BSU is funded through multiple state and federal grants and is charged with providing professional development to inservice teachers across Idaho. IDMT staff members have worked closely with the Idaho State Department of Education (ISDE) to develop and establish the MCTE.

IDMT staff have worked with the State Department of Education to provide a mandated 3-credit professional development course entitled Mathematical Thinking for Instruction (MTI) to K-12 teachers and administrators across the state. Thus far, the course has been taken by over 10,000 teachers and administrators. Our offering of the MTI course has raised inservice teachers' awareness and interest in pursuing further studies in mathematics education. The Graduate Certificate in the Mathematics Consulting Teacher Endorsement (GC-MCTE) will provide teachers the next step in reflecting upon and improving their mathematics instruction and provide schools and districts with individuals who have received high quality professional development and mentoring in order to assist others in this work.

The coursework of the GC-MCTE includes 21 – credits with courses in:

- a) Number, Operations, and Algebraic Thinking
- b) Geometry
- c) Measurement & Data Analysis, Probability and Statistics
- d) Action Research on Lesson Planning and Unit Studies
- e) Mathematics Coaching

In addition, the coursework for the GC-MCTE can serve as 19 of the 33 credits towards a master's in Curriculum and Instruction.

- 2. List the objectives of the program.** The objectives should address specific needs the program will meet. They should also identify and the expected student learning outcomes and achievements. *This question is not applicable to requests for discontinuance.*

The GC-MCTE is intended for individuals who want to develop the professional skills and knowledge to successfully work with teachers and students in developing mathematical understanding.

The program objectives are to develop participants' expertise in the following areas:

- a) Mathematical knowledge of enactive, iconic and symbolic representations for content across the K-12 spectrum
- b) Constructing and evaluating mathematical learning progressions focused on student thinking and representations
- c) Analyzing mathematical tasks for depth, accessibility, and potential for horizontal and vertical mathematization
- d) Understanding of various types and purposes of assessment, including frameworks for constructing and evaluating assessments.
- e) Frameworks for working with teachers to develop lessons, units and courses of study and classroom level coaching.

**3. Briefly describe how the institution will ensure the quality of the program** (i.e., program review). Will the program require specialized accreditation (it is not necessary to address regional accreditation)? If so, please identify the agency and explain why you do or do not plan to seek accreditation. *This question is not applicable to requests for discontinuance.*

The design of the MCTE program includes many of the recommendations from the Association for Mathematics Teacher Educators (AMTE) document *Elementary Mathematics Specialist Standards*. The program will maintain components of the research from Developing Mathematical Thinking projects. All instructors of the courses must have the following:

***Professional Preparation***

- An Idaho Teaching Certification and at least a master's degree or beyond with focus in mathematics education
- Exemplary mathematics content knowledge for *K-12* mathematics

***Work Experience***

- Demonstrated success in increasing student achievement over time and demonstrated success with diverse groups of students
- Rich and varied professional work experiences appropriate to the K-12 mathematics specialist position including *at least three years of experience* teaching mathematics as well as relevant experiences beyond the classroom
- Should be familiar with multiple teaching and assessment strategies, with *emphasis on reform-oriented approaches and models*

***Experience Working with Teachers***

- The candor and personality that allows them to work effectively with teachers
- Leadership skills that enable them to bring teachers, administrators, departments, etc. together and to foster communication and collaboration
- Experience in planning, developing, and delivering effective mathematics professional development at the building, local, and state level

In addition, the institutional recommendation form for the MCTE details the specific competencies an individual must exhibit to receive the recommendation. The competency checklist is provided at the end of this document (Appendix B).

Finally, the following measures will ensure the high quality of the proposed program and certificates:

*Regional Institutional Accreditation:* Boise State University is regionally accredited by the Northwest Commission on Colleges and Universities (NWCCU). Regional accreditation of the university has been continuous since initial accreditation was conferred in 1941. Boise State University is currently accredited at all degree levels (A, B, M, D).

*Program Review:* Internal program evaluations will take place every five years as part of the normal departmental review process conducted by the Office of the Provost. This process requires a detailed self-study (including outcome assessments) and a comprehensive review and site visit by external evaluators.

*Specialized Accreditation:* The College of Education (COE) programs, including social sciences secondary education programs, are accredited by the National Council for Accreditation of Teacher Education (NCATE) and the program in question will continue be reviewed by NCATE. The COE just completed an NCATE review in 2008-09 and as a result, a COE assessment committee has developed new procedures for ensuring the quality of programs within the COE, to include assessment and data reporting procedures.

- 4. List new courses that will be added to your curriculum specific for this program.** Indicate number, title, and credit hour value for each course. Please include course descriptions for new and/or changes to courses. *This question is not applicable to requests for discontinuance.*

No new courses will be added for these emphases. Courses were added to the BSU course catalog in 2011 in preparation for the MCTE endorsement. The courses are listed in Appendix A.

- 5. Please provide the program completion requirements to include the following and attach a typical curriculum to this proposal as Appendix A.** *For discontinuation requests, will courses continue to be taught?*

Credit hours required:	21
Credit hours required in support courses:	0
Credit hours in required electives:	0
Credit hours for thesis or dissertation:	0
<b>Total credit hours required for completion:</b>	<b>21</b>

- 6. Describe additional requirements such as preliminary qualifying examination, comprehensive examination, thesis, dissertation, practicum or internship, some of which may carry credit hours included in the list above.** *This question is not applicable to requests for discontinuance.*

To be eligible for the MCTE, individuals must demonstrate the competencies specified in the institutional recommendation form required by the Idaho State Department of Education (ISDE). The IDMT group at Boise State University worked in conjunction with the ISDE to create a draft of the competency checklist for the MCTE program. The competency checklist is provided at the end of this document as Appendix B.

- 7. Identify similar programs offered within Idaho or in the region by other colleges/universities.** *If the proposed request is similar to another state program, provide a rationale for the duplication.*

To our knowledge, BSU is the first college or university to propose to offer the MCTE through a graduate certificate or professional development credits.

**Degrees/Certificates offered by school/college or program(s) within disciplinary area under review**

Institution and Degree name	Level	Specializations within the discipline (to reflect a national perspective)	Specializations offered within the degree at the institution
BSU			
CSI			
CWI			
EITC			
ISU			
LCSC			
NIC			
UI			

- 8. Describe the methodology for determining enrollment projections.** *If a survey of student interest was conducted, attach a copy of the survey instrument with a summary of results as **Appendix B**. This question is not applicable to requests for discontinuance.*

An unofficial list has been maintained by the IDMT office, beginning in the fall of 2011, of individuals who have expressed interest in the MCTE when the coursework becomes available. Many of these individuals have heard about the possibility of the endorsement through the MTI course and follow-up professional development provided by IDMT staff. Currently the list has 200+ individuals. We believe this is just a small sample of the number of people who will be interested once more information is provided. Over time, the goal is to have at least one individual per Idaho school (elementary and middle schools) that holds an MCTE.

In addition, the potential for enrollment in the program is indicated by robust enrollments in courses that will be part of the MCTE:

- Enrollments in MCTE courses (ED-CIFS 548) offered during the Summer of 2012 were: 24 students
- Enrollments in MCTE courses (ED-CIFS 549) offered during the Fall of 2012 were: 16 students
- Current enrollments in MCTE courses (ED-CIFS 548) offered for Spring 2013 are: 20 students

- In addition, approximately 60 teachers who are a part of the Developing Mathematical Thinking grant take one of the classes every summer.

**9. Enrollment and Graduates.** Using the chart below, provide a realistic estimate of enrollment at the time of program implementation and over three year period based on availability of students meeting the criteria referenced above. Include part-time and full-time (i.e., number of majors or other relevant data) by institution for the proposed program, last three years beginning with the current year and the previous two years. Also, indicate the projected number of graduates and graduation rates.

Institution	Relevant Enrollment Data (Graduate program only; not professional development students)			Number of Graduates			Graduate Rate
	Current	Year 1 Previous	Year 2 Previous	Current	Year 1 Previous	Year 2 Previous	
BSU	Project ~40 enrollment			Project ~40 graduates per year			40 per year
ISU							
LCSC							
UI							
CSI							
CWI							
EITC							
NIC							

**10. Will this program reduce enrollments in other programs at your institution?** If so, please explain.

No, it is not expected to reduce program enrollments in other programs. The possibility exists for enrollments to increase in Master's and Doctoral level programs because the GC-MCTE courses have the potential be used as a cognate towards these degrees.

**11. Provide verification of state workforce needs such as job titles requiring this degree.** Include State and National Department of Labor research on employment potential.

Using the chart below, indicate the total projected job openings (including growth and replacement demands in your regional area, the state, and nation. Job openings should represent positions which require graduation from a program such as the one proposed. Data should be derived from a source that can be validated and must be no more than two years old. *This question is not applicable to requests for discontinuance.*

	Year 1	Year 2	Year 3
Local (Regional)			
State			
Nation			

a. Describe the methodology used to determine the projected job openings. If a survey of employment needs was used, please attach a copy of the survey instrument with a summary of results as **Appendix C**.

See c.

b. Describe how the proposed change will act to stimulate the state economy by advancing the field, providing research results, etc.

See c.

- c. Is the program primarily intended to meet needs other than employment needs, if so, please provide a brief rationale.

The MCTE program is intended to increase the skills and knowledge of existing teachers to assist them in becoming school and district leaders of mathematics. Mathematics education is in a time of intense change with the adoption of the Common Core State Standards for Mathematics, the implementation of a new testing system (Smarter Balanced Assessment), and the widespread understanding regarding needed changes in mathematics instruction following the MTI course. Schools and districts need teachers who can act as district leaders and assist in these changes in a meaningful way. The MCTE program will assist greatly in this area.

**12. Will any type of distance education technology be utilized in the delivery of the program on your main campus or to remote sites? Please describe.** *This question is not applicable to requests for discontinuance.*

Currently, IDMT has a contract with the ISDE to deliver the first two courses required in the endorsement – MTI K-3, 4-8 and 6-12. We are currently developing hybrid versions of these courses; over time, we plan to offer hybrid versions of all the MCTE courses.

**13. Describe how this request is consistent with the State Board of Education's strategic plan and institution's role and mission.** *This question is not applicable to requests for discontinuance.*

The MCTE is focused on high-quality teacher preparation for inservice teachers. Graduates will contribute to the state through their greater competence in the STEM disciplines. Therefore, the proposed program will serve the following aspects of the SBOE strategic plan:

**GOAL 1: A WELL EDUCATED CITIZENRY**

*The educational system will provide opportunities for individual advancement.*

*Objective A: Access – Increased access to a highly relevant set of coursework..*

*Objective B: Higher Level of Educational Attainment*

*Objective D: Transition – Improve the ability of the educational system to meet educational needs and allow students to efficiently and effectively transition into the workforce*

**GOAL 2: CRITICAL THINKING AND INNOVATION**

*The educational system will provide an environment for the development of new ideas, and practical and theoretical knowledge to foster the development of individuals who are entrepreneurial, broadminded, think critically, and are creative.*

*Objective B: Innovation and Creativity*

*Objective C: Quality Instruction – Increase student performance through the recruitment and retention of a diverse and highly qualified workforce of teachers, faculty, and staff.*

The following bolded passages show the relevance of the program to Boise State

## University's Mission:

*Boise State University is a public, metropolitan, research university offering an array of undergraduate and graduate degrees and experiences that foster student success, lifelong learning, community engagement, innovation and creativity. Research and creative activity advance new knowledge and benefit students, the community, the state and the nation. As an integral part of its metropolitan environment the university is engaged in professional and continuing education programming, policy issues, and promoting the region's economic vitality and cultural enrichment.*

The MCTE will offer continuing education programming to inservice teachers of mathematics. In addition, the program seeks to "...foster student success, lifelong learning, community engagement, innovation and creativity" through meaningful development of participants mathematical understanding.

- 14. Describe how this request fits with the institution's vision and/or strategic plan. This question is not applicable to requests for discontinuance.**

Goals of Institution Strategic Mission	Proposed Program Plans to Achieve the Goal
Goal 1: Create a signature, high-quality educational experience for all students.	Creates a program more attuned to the needs of our students.

- 15. Is the proposed program, program discontinuance, or program modification/consolidation on your institution's 5-year plan? Indicate below. This question is not applicable to requests for discontinuance.**

Yes \_\_\_\_ No x

If the proposed program or program modification/consolidation is not on your institution's Five-Year plan, answer the following questions. Responses will be reviewed by the Council on Academic Affairs and Programs (CAAP) to determine whether the proposed program meets the following criteria and CAAP will present the Board's Instruction, Research, and Student Affairs Committee with a recommendation.

- a. Program Planning** Justify why the proposed program is not on the institution's five year plan. When did consideration of and planning for the new program begin? Explain how the proposed program fits in the context of existing programs offered by the university and in the context of programs offered by other institutions in the state. Is it a natural outgrowth of existing programs? Does the program fall within the statewide responsibility of your institution or that of other institutions?

The original plan was to embed a set of courses for the MCTE into existing Master's and Doctoral programs in the College of Education. The endorsement was approved by the PSC in February, 2012. In October, 2012, in response to an email from OSBE clarifying the need to submit a proposal for the endorsement, we began the preparation of the proposal. The

program to be proposed evolved to become the self support, graduate certificate program described in this proposal. At the time of spring 2012 planning for the five year plan, we were focused on the creation of an endorsement, and there was no indication at that time that endorsements were to be included on the 5 year plan. It was only in late Fall 2012 that it was decided to pursue a self support graduate certificate as the way to best provide the broad access to graduate and professional development coursework.

The GC-MCTE program fits within the context of three graduate degrees within the college of Education; (1) Master of Arts in Education, Curriculum, and Instruction, (2) Master of Science in STEM Education, and (3) Doctor of Education in Curriculum and Instruction. Each of these programs has elective or cognate options that can be fulfilled through the GC-MCTE. The focus of the MCTE coursework will provide individuals with a specialty area of emphasis within their degree. The MCTE program is an outgrowth of several items; (1) the state-wide MTI course requirement mandate, (2) the adoption of the Common Core State Standards for Mathematics and associated assessments, and (3) the need/desire at the Master's and Doctoral level for individuals to have areas of focus within their graduate degrees.

The program is not the statewide responsibility of any institution. It is the regional responsibility of Boise State to offer graduate programs in education.

- b. Immediate Need** Describe whether the proposed program is in response to a specific industry need or workforce opportunity. Could the institution delay the proposal for implementation of the new program until it fits within the five-year planning cycle? What would be lost by delaying and what would be gained by an early consideration?

The MCTE program design is the result of specific requests from teachers, schools, districts and the State Department of Education to meet the need to have highly trained individuals that can assist in the implementation and continued support around the Common Core State Standards for Mathematics (CCSS-M). The CCSS-M are scheduled for implementation in Fall of 2013 and the new associated assessments from the Smarter Balanced Assessment Consortium (SBAC) are scheduled to begin in Spring of 2015. The assessments from SBAC represent a significant philosophical departure from our current Idaho Standards Achievement Test (ISAT) in its extensive focus on understanding mathematics conceptually and the importance of application of mathematics to practical situations. Educators in Idaho and across the nation need assistance in shifting mathematics instructional practice to meet the demands of the new standards and assessments. A delay in implementing the proposed program would result in a significant gap in the offering of MCTE courses at the university level, which in turn would result in a delay in better preparing our K-12 mathematics teacher educators and leaders in Idaho.

- c. Resources** Explain if the proposed program is reliant on external funding (grants, donations) with a deadline for acceptance of funding.

N/A

- d. Contractual Obligation** Is there a contractual obligation or partnership opportunity to justify the program? N/A

- e. Accreditation Requirements** Is the program request or program change in response to accreditation requirements or recommendations?

N/A

- f. Teacher Certification/Endorsement Requirements** Is the program request or program change in response to recent changes to teacher certification/endorsement requirements?

Yes, this program request is in response to the recent creation of the Mathematics Consulting Teacher Endorsement (MCTE) that was placed in administrative rule during the spring of 2010. Faculty at Boise State University began work in the fall of 2010 to have courses that would eventually serve as the basis for the MCTE program offered at the graduate level. This process was finalized during the spring of 2011. Beginning in the fall of 2011 the paperwork process was started to offer the Mathematics Consulting Teacher Endorsement at Boise State University. The first step was to receive the Professional Standards Committee (PSC) approval. This was completed in February of 2012. Once PSC approval was received, the process of receiving State Board of Education approval was started in late spring of 2012. During the process of preparing the paperwork for the endorsement request it was decided that a graduate certificate program would be the best option for program participants by providing flexibility in the type of credits and therefore cost of the program to participants. This resulted in a delay of the request to the State Board of Education until February of 2013.

- 16. Explain how students are going to learn about this program and where students are going to be recruited from (i.e., within institution, out-of-state, internationally). For requests to discontinue a program, how will continuing students be advised of impending changes and consulted about options or alternatives for attaining their educational goals?**

The majority of the program participants will be teachers who are currently teaching in Idaho schools. Many individuals (over 10,000 teachers and administrators) have learned about the potential for the program during their participation in the state-mandated MTI course and expressed interest in participating. The program can be advertised through several routes; (1) during the MTI course, (2) MTI newsletter that is delivered electronically to course participants following their participation in the course, (3) at MTI follow-up opportunities that are delivered state-wide by the six regional math specialists, (4) IDMT website, and (4) ISDE communication methods (e.g., Ed Source Newsletter).

- 17. In accordance with Board Policy III.G., an external peer review is required for any new doctoral program. Attach the peer review report as Appendix D.**

Not applicable

- 18. Program Resource Requirements.** Using the Excel spreadsheet provided by the Office of the State Board of Education indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first three fiscal years of the program. Include reallocation of existing personnel and resources and anticipated or requested new resources. Second and third year estimates should be in constant dollars. Amounts should reconcile budget explanations below. If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies). Provide an explanation of the fiscal impact of the proposed discontinuance to include impacts to faculty (i.e., salary savings, re-assignments).

<b>I. Planned Student Enrollment</b>		(FTE calculated as 1 FTE = 24 credit hours per year for grad programs; Headcount calculated as 1/3 of total registrations for year; assumes each student takes 3 courses)							
		FY 14		FY 15		FY 16		Cumulative Totals	
		FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount
A. New Enrollments		9	22	24	27	24	27	56	76
B. Shifting Enrollments		0	0	0	0	0	0	0	0
<b>II. Revenue</b>		FY 14		FY 15		FY 16		Cumulative Totals	
		On-going	One-time	On-going	One-time	going	One-time	going	One-time
1. Appropriated-Reallocation									\$0
2. Appropriated new									\$0
3. Federal									\$0
4. Tuition									\$0
5. Student Fees			\$48,600		\$126,900		\$126,900		\$302,400
6. Other (Local Account)			\$18,165		-\$14,209		-\$3,956		\$0
<b>Total Revenue</b>		<b>\$0</b>	<b>\$66,765</b>	<b>\$0</b>	<b>\$112,691</b>	<b>\$0</b>	<b>\$122,944</b>	<b>\$0</b>	<b>\$302,400</b>
<b>III. Expenditures</b>		FY 14		FY 15		FY 16		Cumulative Totals	
		On-going	One-time	On-going	One-time	going	One-time	going	One-time
<b>A. Personnel Costs</b>									
1. FTE			0.94		1.54		1.54		4.0
2. Faculty			\$26,870		\$58,305		\$58,305	\$0	\$143,481
3. Administrators			\$10,000		\$10,000		\$10,000	\$0	\$30,000
4. Adjunct Faculty			\$0		\$0		\$0	\$0	\$0
5. Instructional Assts			\$0		\$0		\$0	\$0	\$0
6. Research Personnel			\$0		\$0		\$0	\$0	\$0
7. Support personnel			\$7,600		\$7,600		\$7,600	\$0	\$22,800
8. Fringe benefits			\$11,720		\$22,408		\$22,408	\$0	\$56,535
<b>Total FTE personnel and costs</b>			<b>\$56,190</b>		<b>\$98,313</b>		<b>\$98,313</b>	<b>\$0</b>	<b>\$252,816</b>
<b>B. Operating Expenditures</b>		FY 14		FY 15		FY 16		Cumulative Totals	
1. Travel			\$2,500		\$2,500		\$2,500	\$0	\$7,500
4. Communications			\$1,000		\$2,000		\$3,000	\$0	\$6,000
6. Materials and Supplies			\$1,000		\$1,000		\$1,000	\$0	\$3,000
7. Rentals			\$500		\$500		\$500	\$0	\$1,500
10. Miscellaneous			\$1,000		\$1,000		\$1,000	\$0	\$3,000
<b>TOTAL OPERATING EXPENSES</b>			<b>\$6,000</b>		<b>\$7,000</b>		<b>\$8,000</b>	<b>\$0</b>	<b>\$21,000</b>
<b>C. Capital Outlay</b>		FY 14		FY 15		FY 16		Cumulative Totals	
1. Library resources			\$0		\$0		\$0		\$0
2. Equipment			\$500		\$500		\$500		\$1,500
<b>D. Physical facilities construction</b>			\$0		\$0		\$0		\$0
<b>E. Indirect costs (overhead)</b>			\$4,075		\$6,878		\$6,943		\$17,896
<b>TOTAL EXPENDITURES</b>			<b>\$66,765</b>		<b>\$112,691</b>		<b>\$113,756</b>		<b>\$293,212</b>
<b>Net Income (Deficit) per year</b>			<b>\$0</b>		<b>\$0</b>		<b>\$9,188</b>		<b>\$9,188</b>
<b>Net Income (Deficit) cumulative</b>			<b>\$0</b>		<b>\$0</b>		<b>\$9,188</b>		<b>\$9,188</b>

Ongoing is defined as ongoing operating budget for the program which will become part of the base.

One-time is defined as one-time funding in a fiscal year and not part of the base.

## Budget Notes:

II.6. Initial startup costs will be funded by college local funds and repaid from income before the end of the third year of the program.

III.E. Indirect costs comprise 6.5% of expenditures as University administrative cost.

**a. Personnel Costs****Faculty and Staff Expenditures**

Project for the first three years of the program the credit hours to be generated by each faculty member (full-time and part-time), graduate assistant, and other instructional personnel. Also indicate salaries. After total student credit hours, convert to an FTE student basis. Please provide totals for each of the three years presented. Salaries and FTE students should reflect amounts shown on budget schedule.

<b>FY 2014</b>	<b>Annual Salary Rate</b>	<b>FTE Assignment to this Program</b>	<b>Projected Student Credit Hours</b>	<b>FTE Students</b>
<b>Name, Position &amp; Rank</b>				
Jonathan Brendefur, Professor	\$83,351	0.2	108	4.5
Michele Carney, Assistant Professor	\$51,000	0.2	108	4.5

<b>FY 2015</b>	<b>Annual Salary Rate</b>	<b>FTE Assignment to this Program</b>	<b>Projected Student Credit Hours</b>	<b>FTE Students</b>
<b>Name, Position &amp; Rank</b>				
Jonathan Brendefur, Professor	\$83,351	0.3	180	7.5
Michele Carney, Assistant Professor	\$51,000	0.3	180	7.5
Clinical Faculty	\$45,000	0.3	180	7.5

<b>FY 2016</b>	<b>Annual Salary Rate</b>	<b>FTE Assignment to this Program</b>	<b>Projected Student Credit Hours</b>	<b>FTE Students</b>
<b>Name, Position &amp; Rank</b>				
Jonathan Brendefur, Professor	\$83,351	0.3	180	7.5
Michele Carney, Assistant Professor	\$51,000	0.3	180	7.5
Clinical Faculty	\$45,000	0.3	180	7.5

Note: Faculty FTE calculated as 1.0 FTE= 30 credit hours per year; Student FTE calculated as 1.0FTE = 24 student credit hours

Project the need and cost for support personnel and any other personnel expenditures for the first three years of the program.

Name, Position & Rank	Annual Salary Rate	FTE Assignment to this Program	Program Salary
Whitney Hansen, Admin II	\$30,000	0.2	\$6000
Student Worker	\$8/hr	4 hrs/wk	\$1600

The support personnel expenditures are expected to remain consistent for FY 2014, 2015 and 2016.

### Administrative Expenditures

Describe the proposed administrative structure necessary to ensure program success and the cost of that support. Include a statement concerning the involvement of other departments, colleges, or other institutions and the estimated cost of their involvement in the proposed program

Name, Position & Rank	Annual Salary Rate	FTE Assignment to this Program	Value of FTE Effort to this Program
Jonathan Brendefur, Professor	\$83,351	0.06	\$5000
Michele Carney, Assistant Professor	\$51,000	0.10	\$5000

Administrative expenditures are expected to remain consistent for FY 2014, 2015 and 2016.

### b. Operating Expenditures

Briefly explain the need and cost for operating expenditures (travel, professional services, etc.)

Operating expenses for FY2014 consist of the following:

	Costs
Travel	\$2500
Promotion (Website Development)	\$1000
Office Supplies	\$1000
Room Rentals	\$500
Miscellaneous	\$1000

### c. Capital Outlay

#### (1) Library resources

- (a) Evaluate library resources, including personnel and space. Are they adequate for the operation of the present program? If not, explain the action necessary to ensure program success.

The current library resources are adequate to support the program.

- (b) Indicate the costs for the proposed program including personnel, space, equipment, monographs, journals, and materials required for the program.

No additional costs.

- (c) For off-campus programs, clearly indicate how the library resources are to be provided.

The library resources for the GC-MCTE will primarily be journal article access than can occur online via electronic subscriptions to organizations such as SAGE and J-STOR.

(2) Equipment/Instruments

Describe the need for any laboratory instruments, computer(s), or other equipment. List equipment, which is presently available and any equipment (and cost) which must be obtained to support the proposed program.

Not applicable.

**d. Revenue Sources**

- (1) If funding is to come from the reallocation of existing state appropriated funds, please indicate the sources of the reallocation. What impact will the reallocation of funds in support of the program have on other programs?

Not applicable – self-support program

- (2) If the funding is to come from other sources such as a donation, indicate the sources of other funding. What are the institution's plans for sustaining the program when funding ends?

Not applicable – self-support program

- (3) If an above Maintenance of Current Operations (MCO) appropriation is required to fund the program, indicate when the institution plans to include the program in the legislative budget request.

Not applicable – self-support program

- (4) Describe the federal grant, other grant(s), special fee arrangements, or contract(s) to fund the program. What does the institution propose to do with the program upon termination of those funds?

Not applicable – self-support program

- (5) Provide estimated fees for any proposed professional or self-support program.

We plan to charge \$225 per graduate credit. In the second year of the program (when the program is fully functional). We will teach a total of 10 courses of 3 credits each with an estimate of 18-20 students per class. We expect approximately 188 graduate student class registrations per year. This will produce 564 graduate student credit hours for a total gross income of \$126,900.

**Appendix A: Proposed Curriculum and Listing of Courses.**

Course Number and Title	Credits
<b>Select a minimum of two of the following:</b>	6
ED-CIFS 540 MTI: NUMBER AND OPERATIONS K-3	
ED-CIFS 542 MTI: NUMBER AND OPERATIONS 4-8	
ED-CIFS 544 MTI: NUMBER AND OPERATIONS 6-12	
<b>Select a minimum of one of the following:</b>	3
ED-CIFS 541 MTI: EARLY NUMERACY AND OPERATIONS K-3	
ED-CIFS 543 MTI: RATIONAL NUMBERS, RATIO, AND PROPORTION 4-8	
ED-CIFS 545 MTI: ADVANCED ALGEBRA	
<b>Required Courses</b>	12
ED-CIFS 547 MTI: MEASUREMENT AND GEOMETRY	
ED CIFS 548 MTI: PROBABILITY, DATA ANALYSIS, and STATISTICS	
ED CIFS 546 MTI: BUILDING TEACHER LEADERS OF MATHEMATICS	
ED-CIFS 549 MTI: ACTION RESEARCH	
<b>Total:</b>	<b>21</b>

**EDCIFS 540 MATHEMATICAL THINKING FOR INSTRUCTION: NUMBER AND OPERATIONS K-3 (3 Credits).** Examines how children develop an understanding of the following topics: number sense, addition, subtraction, multiplication, division, place value, rational number, and algebraic reasoning. Emphasizes an investigative approach involving problem solving, reasoning and proof, connections, representations, and communication.

**ED CIFS 541 MATHEMATICAL THINKING FOR INSTRUCTION: EARLY NUMERACY AND OPERATIONS (3 Credits).** Examines how children develop an understanding of the following topics: the relationship between development and early numeracy, counting, one-to-one correspondence, and early number sense. Emphasizes an investigative approach involving problem solving, reasoning and proof, connections, representations, and communication. PREREQ: ED-CIFS 504 or PERM/INST.

**ED CIFS 542 MATHEMATICAL THINKING FOR INSTRUCTION: NUMBER AND OPERATIONS 4-8 (3 Credits).** Examines topics in number and operations taught in grades 4-8 with an emphasis on an investigative approach involving problem solving, reasoning and proof, connections, representations and communication. Topics include a focus on the foundational structure of rational numbers, rational number operations, and algebraic reasoning.

**ED CIFS 543 MATHEMATICAL THINKING FOR INSTRUCTION: APPLICATIONS OF RATIONAL NUMBERS, RATIO, AND PROPORTION (3 Credits).** Examines topics related to the application of rational number and rational number operations with an emphasis on an investigative approach involving problem solving, reasoning and proof, connections, representations and communication. Topics include comparison, ratio, proportion, and early algebraic applications. PREREQ: ED-CIFS 542 or PERM/INST.

**ED-CIFS 544 MATHEMATICAL THINKING FOR INSTRUCTION: NUMBER AND OPERATIONS 6-12 (3 Credits).** Examines topics in number and operations that are foundational to an understanding of Algebra with an emphasis on an investigative approach involving problem solving, reasoning and proof, connections, representations and communication. Topics include equality, algebraic reasoning, generalizing, functions, and modeling.

**ED CIFS 545 MATHEMATICAL THINKING FOR INSTRUCTION: ADVANCED ALGEBRA (3 Credits).**

Examines topics in algebra that are foundational to an understanding of the application of advanced algebraic concepts with an emphasis on an investigative approach involving problem solving, reasoning and proof, connections, representations and communication. Topics include generalization, functions, modeling, and their application in understanding the structure of mathematics through early Calculus. PREREQ: ED-CIFS 544 or PERM/INST.

**ED CIFS 546 MATHEMATICAL THINKING FOR INSTRUCTION: BUILDING TEACHER LEADERS OF MATHEMATICS (3 Credits).**

Examines foundational topics of effective professional development and coaching strategies with individuals and groups of teachers of mathematics with an emphasis on an investigative approach involving problem solving, reasoning and proof, connections, representations and communication. Topics include effective modeling, observation, collaboration, unit study, and best practices as informed by current research.

**ED CIFS 547 MATHEMATICAL THINKING FOR INSTRUCTION: MEASUREMENT AND GEOMETRY (3 Credits).**

Examines topics in measurement and geometry with an emphasis on an investigative approach involving problem solving, reasoning and proof, connections, representations and communication. Topics include unit, zero, transitivity, conservation, shape, and space.

**ED CIFS 548 MATHEMATICAL THINKING FOR INSTRUCTION: PROBABILITY, DATA ANALYSIS, and STATISTICS (3 Credits).**

Examines topics foundational to an understanding of probability, data analysis, and statistics with an emphasis on an investigative approach involving problem solving, reasoning and proof, connections, representations and communication. Topics include experimental and theoretical probability, the law of large numbers, sample space, independent and dependent events, central tendencies, spread, and representations.

**ED CIFS 549 MATHEMATICAL THINKING FOR INSTRUCTION: ACTION RESEARCH AND ITS IMPLICATIONS IN THE MATHEMATICS CLASSROOM (3 Credits).**

Examines topics related to mathematics education and instruction with a focus on reviewing current mathematics education research, instructional implementation, and summarizing and evaluating findings. Topics selected by the student with instructor's approval.

## Appendix B.

### Proposed K-12 Mathematics Consulting Teacher Endorsement Program of Study

#### Boise State University Department of Curriculum and Instruction

Submitted by:

Michele Carney

Associate Director, Initiative for Developing Mathematical Thinking

[michelecarney@boisestate.edu](mailto:michelecarney@boisestate.edu)

208-426-4650

The Department of Curriculum and Instruction at Boise State University requests approval to implement a program of study for students interested in pursuing the K-12 Mathematics Consulting Teacher Endorsement. Dr. Jonathan Brendefur, a faculty member within the Department of Curriculum, Instruction & Foundational Studies, has worked closely with the Idaho State Department of Education to develop and establish the K-12 Mathematics Consulting Teacher Endorsement. Dr. Brendefur directs the Initiative for Developing Mathematical Thinking (IDMT) at Boise State University. The IDMT group has worked with teachers and administrators statewide to provide a mandated 3-credit professional development course Mathematical Thinking for Instruction (MTI). The MTI course has raised teachers' awareness and interest in pursuing further mathematics studies. The K-12 Mathematics Consulting Teacher Endorsement will provide teachers the next step in reflecting upon and improving their mathematics instruction and provide districts with individuals who are trained to assist others in this work.

Sample courses in this graduate level endorsement that would allow students to build the necessary skills and gather artifacts as evidence of competency include the following (with their descriptions):

#### **Proposed Catalog Statement:**

- **EDCIFS 540 MATHEMATICAL THINKING FOR INSTRUCTION: NUMBER AND OPERATIONS K-3 (3-0-3) (F/S/SU).** Examines how children develop an understanding of the following topics: number sense, addition, subtraction, multiplication, division, place value, rational number, and algebraic reasoning. Emphasizes an investigative approach involving problem solving, reasoning and proof, connections, representations, and communication.
- **ED CIFS 541 MATHEMATICAL THINKING FOR INSTRUCTION: EARLY NUMERACY AND OPERATIONS (3-0-3) (F/S/SU).** Examines how children develop an understanding of the following topics: the relationship between development and early numeracy, counting, one-to-one correspondence, and early number sense. Emphasizes an investigative approach involving problem solving, reasoning and proof, connections, representations, and communication. PREREQ: ED-CIFS 504 or PERM/INST.

- **ED CIFS 542 MATHEMATICAL THINKING FOR INSTRUCTION: NUMBER AND OPERATIONS 4-8 (3-0-3) (F/S/SU).** Examines topics in number and operations taught in grades 4-8 with an emphasis on an investigative approach involving problem solving, reasoning and proof, connections, representations and communication. Topics include a focus on the foundational structure of rational numbers, rational number operations, and algebraic reasoning.
- **ED CIFS 543 MATHEMATICAL THINKING FOR INSTRUCTION: APPLICATIONS OF RATIONAL NUMBERS, RATIO, AND PROPORTION (3-0-3) (F/S/SU).** Examines topics related to the application of rational number and rational number operations with an emphasis on an investigative approach involving problem solving, reasoning and proof, connections, representations and communication. Topics include comparison, ratio, proportion, and early algebraic applications. PREREQ: ED-CIFS 542 or PERM/INST.
- **ED-CIFS 544 MATHEMATICAL THINKING FOR INSTRUCTION: NUMBER AND OPERATIONS 6-12 (3-0-3) (F/S/SU).** Examines topics in number and operations that are foundational to an understanding of Algebra with an emphasis on an investigative approach involving problem solving, reasoning and proof, connections, representations and communication. Topics include equality, algebraic reasoning, generalizing, functions, and modeling.
- **ED CIFS 545 MATHEMATICAL THINKING FOR INSTRUCTION: ADVANCED ALGEBRA (3-0-3) (F/S/SU).** Examines topics in algebra that are foundational to an understanding of the application of advanced algebraic concepts with an emphasis on an investigative approach involving problem solving, reasoning and proof, connections, representations and communication. Topics include generalization, functions, modeling, and their application in understanding the structure of mathematics through early Calculus. PREREQ: ED-CIFS 544 or PERM/INST.
- **ED CIFS 546 MATHEMATICAL THINKING FOR INSTRUCTION: BUILDING TEACHER LEADERS OF MATHEMATICS (3-0-3) (F/S/SU).** Examines foundational topics of effective professional development and coaching strategies with individuals and groups of teachers of mathematics with an emphasis on an investigative approach involving problem solving, reasoning and proof, connections, representations and communication. Topics include effective modeling, observation, collaboration, unit study, and best practices as informed by current research.
- **ED CIFS 547 MATHEMATICAL THINKING FOR INSTRUCTION: MEASUREMENT AND GEOMETRY (3-0-3) (F/S/SU).** Examines topics in measurement and geometry with an emphasis on an investigative approach involving problem solving, reasoning and proof, connections, representations and communication. Topics include unit, zero, transitivity, conservation, shape, and space.

- **ED CIFS 548 MATHEMATICAL THINKING FOR INSTRUCTION: PROBABILITY, DATA ANALYSIS, and STATISTICS (3-0-3) (F/S/SU).** Examines topics foundational to an understanding of probability, data analysis, and statistics with an emphasis on an investigative approach involving problem solving, reasoning and proof, connections, representations and communication. Topics include experimental and theoretical probability, the law of large numbers, sample space, independent and dependent events, central tendencies, spread, and representations.
- **ED CIFS 549 MATHEMATICAL THINKING FOR INSTRUCTION: ACTION RESEARCH AND ITS IMPLICATIONS IN THE MATHEMATICS CLASSROOM (3-0-3) (F/S/SU).** Examines topics related to mathematics education and instruction with a focus on reviewing current mathematics education research, instructional implementation, and summarizing and evaluating findings. Topics selected by the student with instructor's approval.

The matrix below illustrates, in many cases, multiple examples of evidence of learning for each performance indicator. It should also be noted that many of the courses in our program provide similar opportunities for students to meet the competencies for this endorsement.

=====

#### EVIDENCE SOURCES:

The primary evidence sources for each class are described below. The word(s) in bold will be used within the framework to align the performance indicator to a particular evidence source. However, the evidence description below will provide a broader understanding of each source of evidence and its applicability to the performance indicator(s).

For the MTI courses that are available statewide and mandated for recertification, **EDCIFS 540, 542, 544**, the following item will serve as evidence:

- **Workbook.**
  - Includes multiple examples of analysis of the models and strategies associated with mathematical tasks, analysis includes; (1) potential student misconceptions, (2) instructional formats for facilitation, (3) connections between the strategies and models, and (4) understanding of the underlying structures associated with each task.
  - Includes reading assignments on the research literature pertaining to mathematics instruction, learning trajectories, and mathematical content topics. These assignments are followed up by whole-class discussions. Each participant must complete all workbook assignments, worksheets, and extensions.

For **EDCIFS 547 and 548** the following items will serve as evidence:

- **Workbook.**
  - Includes multiple examples of analysis of the models and strategies associated with mathematical tasks, analysis includes; (1) potential student misconceptions,

- (2) instructional formats for facilitation, (3) connections between the strategies and models, and (4) understanding of the underlying structures associated with each task.
  - Includes reading assignments on the research literature pertaining to mathematics instruction, learning trajectories, and mathematical content topics. These assignments are followed up by whole-class discussions. [Each participant must complete all workbook assignments, worksheets, and extensions]
- **Learning progressions or (learning-teaching trajectories).**
  - Organized by:
    - Learning goal(s)
    - Learning activities –instructional tasks and their sequence
    - Thinking and learning in which students might engage on a topic
  - Elements to include (1) a combination of the DMT and ULD lesson plan template, (1) task(s), (2) practice, (3) formative & summative assessment, (4) questions, (5) potential misconceptions, (6) strategies and models, (7) instructional formats, (8) trajectory of models and strategies, and (9) addressing issues of equity and accessibility

For the **EDCIFS 541, 543, 545** the following items will serve as evidence:

- **Workbook.**
  - Includes multiple examples of analysis of the models and strategies associated with mathematical tasks, analysis includes; (1) potential student misconceptions, (2) instructional formats for facilitation, (3) connections between the strategies and models, and (4) understanding of the underlying structures associated with each task.[Each participant must complete all workbook assignments, worksheets, and extensions]
  - Includes reading assignments on the research literature pertaining to mathematics instruction, learning trajectories, and mathematical content topics. These assignments are followed up by whole-class discussions
- **Standards progression (multiple grade-levels).** Construct and evaluate a standards progression for the specific mathematical content of the course. The progression would include the following elements; (1) models, (2) strategies, (3) appropriate contexts, (4) standards, and (5) potential student misconceptions.
- **Learning progressions or (learning-teaching trajectories).**
  - Organized by:
    - Learning goal(s)
    - Learning activities –instructional tasks and their sequence
    - Thinking and learning in which students might engage on a topic
  - Elements to include (1) a combination of the DMT and ULD lesson plan template, (1) task(s), (2) practice, (3) formative & summative assessment, (4) questions, (5) potential misconceptions, (6) strategies and models, (7) instructional formats, (8) trajectory of models and strategies, and (9) addressing issues of equity and accessibility

For the Action Research course, **EDCIFS 549**, the following items will serve as evidence:

- **Unit Creation.**
  - Conduct thorough literature review on unit's mathematical topic
  - Examine and evaluate multiple curricular resources (e.g., textbook, internet, supplemental sources) on unit topic
  - Develop unit plan, to include:
    - Identification of the standards and underlying mathematical structures to be assessed in the unit
    - Pre- and post- unit assessment
    - Sequence of lesson topics
    - Creation of a **learning progression (also referred to as a learning-teaching trajectory)** for a particular topic(s) within the unit.
  - Collect and analyze data from unit
  - Written reflection regarding implementation and potential revisions
  - Revision of unit
- **Mathematics Communication Tool.**
  - Use local level feedback to determine the need for communication tools to increase education stakeholders (e.g., parents, community members, school board members, etc.) understanding of mathematics education and research.
  - Based on the feedback, create a communication tool (e.g., newsletter, PowerPoint presentation, webinar, etc.) to increase stakeholders understanding of mathematics education and research.
  - Determine a means of measuring the effectiveness of the tool in building stakeholder understanding (e.g., evaluation tool for presentation or webinar, focus group feedback on newsletter).
  - Disseminate communication tool to stakeholders.
  - Written reflection evaluating the effective of the communication tool in raising stakeholders' awareness of mathematics education issues and research.

For the Teacher Leaders/Coaching course, **EDCIFS 546**, the following items will serve as evidence:

- **Teacher Observation and Coaching (Internship – conducted over a semester).**
  - Log of pre-conference, observation and post-conference meetings for a minimum of 3 teacher observations, at least two different teachers and grade-levels (i.e., the EDCIFS 546 course participant could observe and coach a 2<sup>nd</sup> grade teacher twice and a 5<sup>th</sup> grade teacher once).
    - Includes focus on examination of at least one of the Building Mathematical Understanding frameworks domains
      - Pressing Students' Conceptually
      - Focusing on Structure of Mathematics
      - Addressing Misconceptions
      - Utilization of Multiple Models and Strategies
      - Taking Students' Ideas Seriously
    - Details elicitation of teacher reflection upon the lesson

- **Unit Study Observation (Internship – conducted over a semester).**
  - Log of events & reflection
    - *The unit study observation is done prior to the unit study facilitation. It is conducted by the course instructor, or IDMT staff. Course participants observe, make notes and reflect upon the process prior to facilitating a unit study.*
- **Unit Study Facilitation (Internship – conducted over a semester).**
  - Develop plan and clear agenda for the unit study facilitation
    - *Pre-unit study planning*
    - Focusing task facilitation
    - Facilitation of information that provides a broad overview of the unit or relevant topics (e.g., literature review, standards, structural components, progressions)
    - Assessment writing facilitation plan
    - Address issues of equity and accessibility
    - Overall unit plan (day-to-day structure of the unit)
  - Log of unit study process
    - *Unit study meeting with teachers*
    - Maintain record of unit study implementation by teachers
  - Final write-up of unit study facilitation
    - *Unit study reflection meeting with teachers*
    - Examination of assessment data
    - Reflection upon the unit study process and improvements for next meeting

## K-12 Mathematics Consulting Teacher Endorsement Matrix

### Framework for Teaching Domain # 1: Planning and Preparation

*Standard #1: Knowledge of Mathematics Education - The K-12 Mathematics Consulting teacher understands the central concepts, tools of inquiry, and structures of mathematics education and creates learning experiences that make these aspects of mathematics education meaningful for learners.*

EDCIFS Course	Performance Indicator	Evidence
<b>EDCIFS 540</b> <b>EDCIFS 541</b> <b>EDCIFS 542</b> <b>EDCIFS 543</b> <b>EDCIFS 544</b> <b>EDCIFS 545</b> <b>EDCIFS 546</b> <b>EDCIFS 547</b> <b>EDCIFS 548</b> <b>EDCIFS 549</b>	Know learning progressions related to mathematical topics and use this knowledge to sequence activities and design instructional tasks (Mathematical Thinking and Learning, 6(2), 2004).	<ul style="list-style-type: none"> <li>• <b>Workbook</b></li> <li>• <b>Learning Progressions</b></li> <li>• <b>Standards progression (multiple grade-levels)</b></li> <li>• <b>Unit Creation</b></li> <li>• <b>Unit Study Facilitation</b></li> <li>• <b>Teacher Observation and Coaching</b></li> </ul>
	Understand learning trajectories/progressions related to particular topics in mathematics (e.g., Sarama & Clements, 2009) and use this knowledge to organize and deliver instruction that is developmentally appropriate and responsive to individual learners.	
	Construct and evaluate multiple representations (enactive, iconic, symbolic) of mathematical ideas or processes, establish correspondences among representations, and understand the purpose and value of doing so.	
	Understand the importance of careful sequencing and development of mathematical ideas, concepts, and skills; be able to engage in discussions and decision-making to establish appropriate benchmarks for learning goals.	

*Standard #2: Knowledge of Human Development and Learning – The K-12 Mathematics Consulting Teacher understands how mathematics learning develops, and provides opportunities that support students’ intellectual development.*

EDCIFS Course	Performance Indicator	Evidence
EDCIFS 540 EDCIFS 541 EDCIFS 542 EDCIFS 543	Analyze and evaluate student ideas and work, and design appropriate responses.	<ul style="list-style-type: none"><li>• <b>Workbook</b></li><li>• <b>Learning Progressions</b></li><li>• <b>Unit Creation</b></li><li>• <b>Unit Study Facilitation</b></li></ul>
EDCIFS 544 EDCIFS 545 EDCIFS 546 EDCIFS 547 EDCIFS 548 EDCIFS 549	Utilize and build upon learners’ existing knowledge, skills, understandings, conceptions and misconceptions to advance learning.	

*Standard #7: Instructional Planning Skills – The K-12 Mathematics Consulting teacher plans and prepares instruction based upon knowledge of subject matter, students, the community, and curriculum goals.*

EDCIFS Course	Performance Indicator	Evidence
<b>EDCIFS 546</b>	Plan, develop, implement, and evaluate professional development programs at the school and district level and support teachers in systematically reflecting and learning from practice.	<ul style="list-style-type: none"> <li>• <b>Unit Study Facilitation</b></li> </ul>
	Select, use, adapt, and determine the suitability of mathematics curricula and teaching materials (e.g., textbooks, technology, manipulatives) for particular learning goals.	
<b>EDCIFS 546</b> <b>EDCIFS 549</b>	Design, select and/or adapt worthwhile mathematics tasks and sequences of examples that support a particular learning goal.	<ul style="list-style-type: none"> <li>• <b>Unit Study Facilitation</b></li> <li>• <b>Unit Creation</b></li> </ul>
<b>EDCIFS 546</b> <b>EDCIFS 541</b> <b>EDCIFS 543</b> <b>EDCIFS 545</b>	Evaluate the alignment of local and state curriculum standards, district textbooks and district and state assessments, and recommend appropriate adjustments to address gaps.	<ul style="list-style-type: none"> <li>• <b>Standards progression (multiple grade-levels)</b></li> <li>• <b>Unit Study Facilitation</b></li> </ul>

## Framework for Teaching Domain #2: The Classroom Environment

*Standard #5: Classroom Motivation and Management Skills - The K-12 Mathematics Consulting Teacher understands individual and group motivation and behavior and creates a learning environment that encourages positive social interaction, active engagement in learning, and self-motivation.*

EDCIFS Course	Performance Indicator	Evidence
EDCIFS 546 EDCIFS 549	Create social learning contexts that engage learners in discussions and mathematical explorations among peers to motivate and extend learning opportunities.	<ul style="list-style-type: none"> <li>• <b>Workbook</b></li> <li>• <b>Learning Progressions</b></li> <li>• <b>Standards progression (multiple grade-levels)</b></li> <li>• <b>Teacher Observation and Coaching</b></li> </ul>
	Develop skillful and flexible use of different instructional formats—whole group, small group, partner, and individual—in support of learning goals.	

## Framework for Teaching Domain #3: Instruction and Assessment

*Standard #3: Modifying Instruction for Individual Needs - The K-12 Mathematics Consulting Teacher understands how students differ in their approaches to learning and creates instructional opportunities that are adapted to learners with diverse needs.*

EDCIFS Course	Performance Indicator	Evidence
EDCIFS 546 EDCIFS 549	Understand and manage diversities of the classroom and school—cultural, disability, linguistic, gender, socio-economic, developmental—and use appropriate strategies to support mathematical learning of all students.	<ul style="list-style-type: none"> <li>• <b>Unit Creation</b></li> <li>• <b>Unit Study Facilitation</b></li> <li>• <b>Teacher Observation and Coaching</b></li> </ul>
	Know the different formats, purposes, uses, and limitations of various types of instruction and assessment for student learning; be able to modify and adapt tasks for monitoring and enhancing student learning.	

## Framework for Teaching Domain #3: Instruction and Assessment

*Standard #4: Multiple Instructional Strategies - The K-12 Mathematics Consulting Teacher understands and uses a variety of instructional strategies to develop students' critical thinking, problem solving, and performance skills.*

EDCIFS Course	Performance Indicator	Evidence
<b>EDCIFS 540</b> <b>EDCIFS 541</b> <b>EDCIFS 542</b> <b>EDCIFS 543</b> <b>EDCIFS 544</b> <b>EDCIFS 545</b> <b>EDCIFS 546</b> <b>EDCIFS 547</b> <b>EDCIFS 548</b> <b>EDCIFS 549</b> <b>EDCIFS 549</b>	<p>Model effective problem solving and mathematical practices (e.g. questioning, representing, communicating, conjecturing, making connections, reasoning and proving, and self-monitoring) and demonstrate knowledge of how to cultivate the development of such practices in learners.</p> <p>Implement and elicit multiple modes of representation (enactive, iconic, symbolic) to develop students' understanding of mathematical models, concepts and strategies.</p>	<ul style="list-style-type: none"> <li>• <b>Workbooks</b></li> <li>• <b>Learning Progressions</b></li> <li>• <b>Unit Creation</b></li> <li>• <b>Teacher Observation and Coaching</b></li> </ul>
<b>EDCIFS 549</b>	<p>Use various instructional applications of technology, judiciously, in ways that are mathematically and pedagogically grounded.</p>	<ul style="list-style-type: none"> <li>• <b>Unit Creation</b></li> </ul>

## Framework for Teaching Domain #3: Instruction and Assessment

*Standard #6: Communication Skills, Networking, and Community Building - The K-12 Mathematics Consulting Teacher uses a variety of communication techniques including verbal, nonverbal, and media to foster inquiry, collaboration, and supportive interaction in and beyond the classroom.*

EDCIFS Course	Performance Indicator	Evidence
<b>EDCIFS 540</b> <b>EDCIFS 541</b> <b>EDCIFS 542</b> <b>EDCIFS 543</b> <b>EDCIFS 544</b> <b>EDCIFS 545</b> <b>EDCIFS 546</b> <b>EDCIFS 547</b> <b>EDCIFS 548</b> <b>EDCIFS 549</b>	Support students' learning of appropriate technical language associated with mathematics, attending to both mathematical integrity and usability by learners.  Use questions to effectively probe mathematical understanding and make productive use of responses.	<ul style="list-style-type: none"> <li>• <b>Workbooks</b></li> <li>• <b>Unit Creation</b></li> <li>• <b>Unit Study Facilitation</b></li> <li>• <b>Teacher Observation and Coaching</b></li> </ul>
<b>EDCIFS 549</b>	Develop learners' abilities to give clear and coherent public mathematical communications in a classroom setting.	<ul style="list-style-type: none"> <li>• <b>Unit Creation</b></li> <li>• <b>Teacher Observation and Coaching</b></li> </ul>

*Standard #8: Assessment of Student Learning - The K-12 Mathematics Consulting Teacher understands, uses, and interprets formal and informal assessment strategies to evaluate and advance student performance and to determine program effectiveness.*

<b>EDCIFS Course</b>	<b>Performance Indicator</b>	<b>Evidence</b>
<b>EDCIFS 540</b> <b>EDCIFS 541</b> <b>EDCIFS 542</b> <b>EDCIFS 543</b> <b>EDCIFS 544</b> <b>EDCIFS 545</b> <b>EDCIFS 546</b> <b>EDCIFS 547</b> <b>EDCIFS 548</b> <b>EDCIFS 549</b>	<p>Analyze formative and summative assessment results, make appropriate interpretations, inform instruction and communicate results to appropriate and varied audiences.</p> <p>Analyze and evaluate student ideas and work, and design appropriate responses.</p>	<ul style="list-style-type: none"> <li>• <b>Unit Creation</b></li> <li>• <b>Workbooks</b></li> <li>• <b>Unit Study Facilitation</b></li> <li>• <b>Teacher Observation and Coaching</b></li> </ul>
<b>EDCIFS 546</b> <b>EDCIFS 549</b>	<p>Know the different formats, purposes, uses, and limitations of various types of assessment of student learning; be able to choose, design, and/or adapt assessment tasks for monitoring student learning [e.g., depth of knowledge (Webb, 2005)].</p>	<ul style="list-style-type: none"> <li>• <b>Unit Creation</b></li> <li>• <b>Unit Study Facilitation</b></li> </ul>

## Framework for Teaching Domain #4: Professional Responsibilities

*Standard #9: Professional Commitment and Responsibility - The K-12 Mathematics Consulting Teacher is a reflective practitioner who demonstrates a commitment to professional standards and is continuously engaged in purposeful mastery of the art and science of mathematics instruction.*

EDCIFS Course	Performance Indicator	Evidence
<b>EDCIFS 540</b> <b>EDCIFS 541</b> <b>EDCIFS 542</b> <b>EDCIFS 543</b> <b>EDCIFS 544</b> <b>EDCIFS 545</b> <b>EDCIFS 546</b> <b>EDCIFS 547</b> <b>EDCIFS 548</b> <b>EDCIFS 549</b>	Evaluate educational structures and policies that affect students' equitable access to high quality mathematics instruction, and act professionally to assure that all students have appropriate opportunities to learn important mathematics.	Although no specific evidence is present for this performance indicator, participation in the Mathematical Thinking for Instruction courses itself provides students with extensive opportunities to discuss policy issues around equity and accessibility to mathematics instruction. Classroom level issues of equity and accessibility (but not necessarily policies) are specifically addressed in the <b>Unit Creation</b> and <b>Unit Study Facilitation</b> .
<b>EDCIFS 546</b> <b>EDCIFS 549</b>	Use professional resources such as professional organization networks, journals, and discussion groups to be informed about critical issues related to mathematics teaching and learning, e.g., mathematics instruction, learning progressions research, and curriculum trends.	<ul style="list-style-type: none"> <li>• <b>Unit Creation</b></li> <li>• <b>Unit Study Facilitation</b></li> </ul>

*Standard #10: Partnerships - The K-12 Mathematics Consulting Teacher interacts in a professional, effective manner with colleagues, parents, and other members of the community to support students' learning and well being.*

EDCIFS Course	Performance Indicator	Evidence
<b>ED CIFS 546</b>	Select from a repertoire of methods to communicate professionally about students, curriculum, instruction, and assessment to educational constituents—parents and other caregivers, school administrators, and school boards.	<ul style="list-style-type: none"> <li>• <b>Mathematics Communication Tool</b></li> </ul>

## INSTITUTIONAL RECOMMENDATION

### MATHEMATICS CONSULTING TEACHER ENDORSEMENT

**Applicant's First, Middle and Last Name** \_\_\_\_\_

**Applicant's Social Security Number** \_\_\_\_\_

**The Applicant MUST:**

1. Meet state's professional teaching and/or licensure standards and is qualified to teach in his/her field of study.
2. Provide evidence of mathematics consulting teacher knowledge and coursework.
3. Confirmation of planning and facilitation of mathematics professional development with teachers.
4. Provide verification of completion of a state-approved program of at least twenty (20) semester credit hours of study in mathematics teaching and learning at an accredited college or university or a state-approved equivalent.

**TO BE COMPLETED by the official in the College of Education responsible for their Mathematics Consulting Teacher Endorsement program:**

The applicant is applying for an Mathematics Consulting Teacher Endorsement on an Idaho Professional Education Credential. One of the requirements is verification of demonstrated competencies in the areas listed below. Please assist the applicant by providing the required verification and checking the appropriate box for the following competencies:

COMPETENCIES	EXHIBITS THIS COMPETENCY	
1. Knowledge of learning progressions for major K-12 mathematics topics and their application in the classroom	<input type="checkbox"/> YES	<input type="checkbox"/> NO
2. Knowledge and use of current and seminal research literature related to mathematics education to improve instructional practice and student achievement	<input type="checkbox"/> YES	<input type="checkbox"/> NO
3. Facilitate continuous improvements in student learning through examination of classroom instructional practices with a focus on meaningfully building all students' learning and application of the content and mathematical practice standards found in the Common Core	<input type="checkbox"/> YES	<input type="checkbox"/> NO
4. Demonstrate ability to facilitate mathematics professional development and collaboration among teachers, including support through professional learning communities	<input type="checkbox"/> YES	<input type="checkbox"/> NO
5. Facilitate evaluation of student work, discourse, and assessment data and determine appropriate instructional response(s) utilizing that information.	<input type="checkbox"/> YES	<input type="checkbox"/> NO
6. Knowledge of learning theories and their meaningful application in multiple educational environments through the use of varied instructional resources	<input type="checkbox"/> YES	<input type="checkbox"/> NO
7. Improve public understanding of mathematics research and associated learning theories through community outreach and collaboration with families	<input type="checkbox"/> YES	<input type="checkbox"/> NO

\_\_\_\_\_  
**Signature**

\_\_\_\_\_  
**Date**

\_\_\_\_\_  
**Title**

\_\_\_\_\_  
**College or University**

**NORTH IDAHO COLLEGE**

**SUBJECT**

Approval of Aerospace Composite Technology Program

**APPLICABLE STATUTE, RULE, OR POLICY**

Idaho State Board of Education Governing Policies & Procedures, Section III.G. 4 and 5

**BACKGROUND/DISCUSSION**

North Idaho College (NIC) proposes to create a new Aerospace Composite Technology program using the \$2.97M grant NIC received from TAACCCT Department of Labor (DOL). The grant is a four year grant. The grant covers the complete instructional costs of the program (until September 30, 2016) and therefore NIC will not be charging tuition. NIC will develop an infrastructure to move the costs of instruction from the grant to the institution which will align with existing costs and revenue structures at NIC by the end of the grant award funding period. NIC will pursue approval from federal financial aid for this program during the grant award period.

NIC will use data gathered from industry need and completion rates to determine the sustainability of the program after the life of the grant (4 years). NIC will also determine if a redistribution of college funds is necessary to continue with any part of the program to meet industry needs.

The Aerospace Composite Technology program will prepare students for entry level employment in the aerospace composites manufacturing industries. The curriculum will provide students with the skills necessary to work in various phases of the composite fabrication and repair, and teach industry-recognized quality assurance procedures. Students will receive hands-on knowledge in a lab setting where the focus is on manufacturing methods and techniques used in aerospace industry composite components.

**IMPACT**

This grant funds all costs of the program for a four year period. The Idaho Department of Labor provided employment forecasts for the aerospace, manufacturing, advanced manufacturing, and machining industries which indicate an increase in employment opportunities. The estimated direct economic impact is \$24.7 million, with an annual impact of \$28.8 million. In addition, a survey and individual interviews with regional industry employers confirmed the employment projections and revealed additional employment opportunities with the local aerospace companies. The local industry has expressed a need for a trained workforce, identifying over 500 potential jobs available in the next four years.

**INSTRUCTION, RESEARCH, AND STUDENT AFFAIRS**  
**JUNE 20, 2013**

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**ATTACHMENTS**

Attachment 1 – Program Proposal - Aerospace Composite Technology Page 3

**STAFF COMMENTS AND RECOMMENDATIONS**

North Idaho College proposes to create a new Aerospace Composite Technology program that will offer the following options: Aerospace Composite Technician, Technical Certificate; Aerospace Core Postsecondary, Technical Certificate; Aerospace Composite Fabrication, Postsecondary Technical Certificate; and Aerospace Composite Repair and Quality Assurance, Postsecondary Technical Certificate.

The Division of Professional-Technical Education (PTE) is working collaboratively with North Idaho College regarding sustainability of this PTE program should future funding be needed. Currently, two sources of PTE funding from both the basic allocation and Perkins are available to reallocate per local discretion. The NIC PTE Dean will begin assessing the viability of each PTE program beginning Spring 2014. Should programs be closed based on this assessment, the current funds for those programs could be reallocated to the Aerospace Composite Technology program.

Another possible source of funding would come from Legislative approval of a line-item request for additional PTE funding specifically for this program. For FY2015, a line-item request to fund an Aerospace Technology instructor has been submitted to the Board for approval.

If reallocation of existing funding, Perkins funding, and additional funding through a line-item request do not cover the cost of this program after the grant funding period, PTE has been assured that NIC is committed to sustaining the program through institutional funding.

It is important to note that the cost of tuition for the students in this program will be covered by the grant. As NIC moves the cost of instruction from the grant to the institution, tuition responsibility will shift back to the students.

The Division of Professional-Technical Education recommends State Board approval of the Proposed Aerospace Technology Program as presented. The program request was shared with the Council on Academic Affairs and Programs (CAAP) on May 25, 2013 and CAAP recommends approval.

**BOARD ACTION**

I move to approve the request by North Idaho College to create a new Aerospace Composite Technology program as provided in the program proposal.

Moved by \_\_\_\_\_ Seconded by \_\_\_\_\_ Carried Yes \_\_\_\_\_ No \_\_\_\_\_

**MEMORANDUM**

June 10, 2013

TO: Mike Rush  
Executive Director  
State Board of Education

FROM: Todd Schwarz  
Administrator



SUBJECT: Program Proposal

In accordance with State Board policy, the enclosed Program Proposal is forwarded for approval by the State Board for Professional-Technical Education.

North Idaho College has requested to add a new **Aerospace Technology** program, which upon approval, will begin in the Fall of 2013. This program will consist of one (1) Technical Certificate and three (3) Postsecondary Technical Certificates offered in various options. The Division has reviewed and approved the request and recommends State Board approval. Please notify the Division office of State Board action when completed.

If you have any questions regarding the enclosed request, please let me know. Thank you.

TS/SJ/ds

Enclosure



# North Idaho College

1000 West Garden Avenue, Coeur d'Alene, Idaho 83814  
[www.nic.edu](http://www.nic.edu)

**Professional-Technical Education**

(208)769-3439 phone  
(208)769-3223 fax  
Kassie\_silvas@nic.edu

May 13, 2013

Dr. Todd Schwarz, State Administrator  
Dr. Vera McCrink, Associate Administrator  
Idaho Division of Professional Technical Education  
650 West State Street  
P.O. Box 83720  
Boise ID 83720-0095

Re: Proposal for PTE Aerospace Composite Technology Program

Dear Todd and Vera

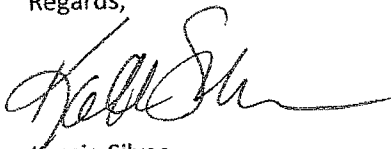
In October 2012, NIC was awarded a \$2.9 million grant through the Trade Adjustment Act to develop an Aerospace Center of Excellence in Aviation Maintenance and Advanced Manufacturing. Per our Statement of Work with the Department of Labor, NIC is developing an Aerospace Center in anticipation of offering several certificates and degrees beginning fall 2013.

The Aerospace Composite Technology program will prepare students for entry level employment in the aerospace composites manufacturing industries. The curriculum will provide students with the skills necessary to work in various phases of the composite fabrication and repair, and teach industry recognized quality assurance procedures. Students will receive hands-on working knowledge from a qualified instructor in a lab setting where the focus is on the manufacturing methods and techniques used in aerospace industry composite components. Coursework will include safety requirements, blueprint reading, composite fabrication and repair, geometric dimensioning and tolerance, shop math and projects specific to industry standards. Students will participate in a blended learning environment; with some courses delivered in an online format. Students will participate in an IBEST learning environment to support student success.

*An Equal Opportunity/Affirmative Action Institution*

Attached please find the updated North Idaho College's application for Aerospace Composite Technology Technical and Post-Secondary certificates as part of North Idaho College's Aerospace Technology program with supporting documentation.

Regards,



Kassie Silvas

Director of Aerospace and Outreach

Attachments:

- New NOI Proposal Aerospace Composite Technology
- ACNT Attachment B Aerospace Composite Technician TC
- ACNT Attachment B Aerospace Core PSTC
- ACNT Attachment B Aerospace Composite Fabrication PSTC
- ACNT Attachment B Aerospace Repair and Quality Assurance PSTC
- Appendix A Program Completion Requirements
- Appendix C NIC Survey Instrument and Survey Results

Institutional Tracking No. \_\_\_\_\_

## Idaho State Board of Education

### Proposal for Other Academic Program Activity and Professional-Technical Education

Date of Proposal Submission:	4/2/2013
Institution Submitting Proposal:	North Idaho College
Name of College, School, or Division:	Trades and Industry Division
Name of Department(s) or Area(s):	Aerospace Technology

**Program Identification for Proposed New, Modified, or Discontinued Program:**

Title:	Aerospace Technology
Degree:	Technical Certificate; Postsecondary Technical Certificates
Method of Delivery:	Professional Technical Program with a combination of theory and lab classes
CIP code (consult IR /Registrar)	15.0801
Proposed Starting Date:	Fall 2013
Indicate if the program is:	<input checked="" type="checkbox"/> Regional Responsibility <input type="checkbox"/> Statewide Responsibility

**Indicate whether this request is either of the following:**

- |  |   |
|--|---|
| <input checked="" type="checkbox"/> New Program (minor/option/emphasis or certificate) | <input type="checkbox"/> Discontinuance of an Existing Program/Option |
| <input checked="" type="checkbox"/> New Off-Campus Instructional Program               | <input type="checkbox"/> Consolidation of an Existing Program         |
| <input type="checkbox"/> New Instructional/Research Unit                               | <input type="checkbox"/> Expansion of an Existing Program             |
| <input type="checkbox"/> Contract Program/Collaborative                                | <input type="checkbox"/> Other : _____                                |

*J. M. Martin* 5/13/13  
 College Dean (Institution) Date

N/A  
 Graduate Dean (as applicable) Date

*Kim Dean* 5/13/13  
 Chief Fiscal Officer (Institution) Date

*Steve G. Burns* 5/13/13  
 Chief Academic Officer (Institution) Date

*James O'Connell* 5/13/13  
 President Date

N/A  
 Vice President for Research (as applicable) Date  
*Bill Swartz* 6.10.13  
 State Administrator, SDPTE (as applicable) Date

Academic Affairs Program Manager Date

Chief Academic Officer, OSBE Date

SBOE/OSBE Approval Date

**Before completing this form, refer to Board Policy Section III.G., Program Approval and Discontinuance.** This proposal form must be completed for the creation of each new program and each program discontinuation. All questions must be answered.

- 1. Describe the nature of the request.** Will this program/option be related or tied to other programs on campus? Please identify any existing program, option that this program will replace. *If this is request to discontinue an existing program, provide the rationale for the discontinuance. Indicate the year and semester in which the last cohort of students was admitted and the final term the college will offer the program. Describe the teach-out plans for continuing students.*

In October 2012, NIC was awarded a \$2.9 million grant through the Trade Adjustment Act to develop an Aerospace Center of Excellence in Aviation Maintenance and Advanced Manufacturing. Per our Statement of Work with the Department of Labor, NIC is developing an Aerospace Center with several certificates and degrees to be available beginning fall 2013. Fall 2013, the college will offer a 27-credit Technical Certificate in Aerospace Composites Technology, and three postsecondary technical certificates in Aerospace Composites and Aerospace Quality Assurance. This program will be the first of its kind to be offered by North Idaho College, and in the State of Idaho.

- 2. List the objectives of the program.** The objectives should address specific needs (industry) the program will meet. They should also identify the expected student learning outcomes and achievements. *This question is not applicable to requests for discontinuance.*

This program will fill a local and regional industry need for qualified aerospace composite manufacturing technicians. Employment in aviation maintenance and advanced manufacturing is growing rapidly in north Idaho, requiring a highly skilled workforce for aerospace jobs. IDOL reported 16% growth in aerospace industry employment in north Idaho from 2008-2009, during the height of the recession. Aerospace employers in north Idaho estimate over 600 new jobs in the next two to three years.

This program prepares students for entry-level employment in the aerospace composites manufacturing industries. The curriculum provides students with the skills necessary to work in various phases of composite fabrication and repair, and teaches industry recognized quality assurance procedures. Students receive hands-on working knowledge from a qualified instructor in a lab setting where the focus is on the manufacturing methods and techniques used in aerospace industry composite components. Coursework includes safety requirements, blueprint reading, composite fabrication and repair, geometric dimensioning and tolerance, shop math and projects specific to industry standards.

**PROGRAM OUTCOMES**

Upon completion of this program, students will be able to:

Students will demonstrate the skills and knowledge necessary to work in various entry-level positions in composite fabrication and composite quality assurance for the aerospace industry, to include:

1. Demonstrate knowledge of personal and aircraft safety standards related to shop layout, equipment use, and the handling and storage of materials.
2. Operate tools and equipment safely.
3. Read and accurately interpret aircraft blueprints.
4. Demonstrate an understanding of, and Define and utilize composite terminology.
5. Consistently display precision manufacturing processes such as measuring, drilling, and fabricating components.
6. Demonstrate appropriate use of cutting tools.
7. Attach fasteners, metal components, brackets, and fittings to composite materials with precision.
8. Demonstrate proper care of composite materials and tools.
9. Fabricate and repair composites using industry recognized techniques.
10. Apply quality assurance techniques to composite processes.
11. Demonstrate the skills and knowledge necessary to repair composites used in the aerospace industry.
12. Demonstrate knowledge of grounding theory, and the proper techniques for fine quality control when performing electrical bonding.
13. Identify and interpret basic Geometric Dimensioning and Tolerancing symbols.
14. Function effectively within diverse groups of individuals by working within team structures on various lab projects and assignments.
15. Use a computer to word process and access the Internet.
16. Demonstrate basic computation and communications skills when performing the job functions required of an aerospace composite technician.

3. **Briefly describe how the institution will ensure the quality of the program** (i.e., program review). Will the program require specialized accreditation (it is not necessary to address regional accreditation)? If so, please identify the agency and explain why you do or do not plan to seek accreditation. *This question is not applicable to requests for discontinuance.*

- a) NIC's Aerospace Composite Technology will follow approved curriculum through NIC's curriculum council.
- b) A strong and active Advisory Committee offers industry guidance on curriculum and employer needs. The advisory committee will meet twice per year.
- c) Program Review every five years; annual updates to program review action plans; quarterly and annual reporting to the Department of Labor.
- d) Program will be included in the college's accreditation by the Northwest Commission of Colleges and Universities.

4. **List new courses that will be added to curriculum specific for this program.** Indicate number, title, and credit hour value for each course. Please include course descriptions for new and/or changes to courses. **Attach a Scope and Sequence, SDPTE Form Attachment B, for professional-technical education requests.** This question is not applicable to requests for discontinuance.

Please see Attachments DPTE Form B

5. **Please provide the program completion requirements and attach to this proposal as Appendix A.** This question is not applicable to requests for discontinuance.

Credit hours required in major:	27
Credit hours required in minor:	N/A
Credit hours in institutional general education or core curriculum:	27
Credit hours in required electives:	0
<b>Total credit hours required for completion:</b>	<b>27</b>

6. **Identify similar programs offered within Idaho or in the region by other colleges/universities.** If the proposed request is similar to another state program, provide a rationale for the duplication. Institutions do not need to complete this section for PTE programs. This question is not applicable to requests for discontinuance.

NIC's certificate(s) program supports Aerospace Technology; specifically, composite technology. Composite Technology teaches knowledge and skills around manufacturing and advanced manufacturing careers. Idaho State University offers an Aircraft Maintenance Technician certificate(s) and degree program. ISU's does not focus on manufacturing but instead on aircraft engines and equipment repair.

**Degrees/Certificates offered by school/college or program(s) within disciplinary area under review**

Institution and Degree name	Level	Specializations within the discipline (to reflect a national perspective)	Specializations offered within the degree at the institution
BSU			
CSI			
CWI			
EITC			
ISU			
LCSC			
NIC			
UI			

- 7. Describe the methodology for determining enrollment projections.** If a survey of student interest was conducted, attach a copy of the survey instrument with a summary of results as **Appendix B**. *This question is not applicable to requests for discontinuance.*

NIC began planning for the grant by creating partnerships and gathering employment statistics to ensure the viability of the Aerospace program. In 2011, the Idaho Aerospace Alliance (IDA) was formed to promote and expand the Idaho economy. IDA is comprised of aviation and aerospace related companies committed to growing the industry sector. IDA endorsed the Soaring to Success program and played a key role in the identification of workforce needs, including the skills and educational credentials needed to develop a highly skilled and qualified workforce for the growing aerospace industry. IDA members gave feedback on the curriculum and program design and are committed to providing a variety of resources to ensure its success. Empire Airlines is committed to partnering with NIC as an industry advisor, providing space, instructors, and equipment as well as work-based learning activities.

- 8. Enrollment and Graduates.** Provide a realistic estimate of enrollment at the time of program implementation and over three year period based on availability of students meeting the criteria referenced above. Include part-time and full-time (i.e., number of majors or other relevant data) by institution for the proposed program, last three years beginning with the current year and the previous two years. Also, indicate the number of graduates and graduation rates.

The program will attempt to run two cohorts of 20 students each, per semester; with multiple starts per year. If enrollment exceeds capacity, then a selective process will be approved by NIC and put into place to allow for veterans and TAA eligible students to have preference.

Institution	Relevant Enrollment Data			Number of Graduates			Graduate Rate
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3	
NIC	75	210	210	60	168	168	80%

**Discontinuations.** Using the chart below include part-time and full-time (i.e., number of majors or other relevant data) by institution for the proposed discontinuation, last three years beginning with the current year and previous two years. Indicate how many students are currently enrolled in the program for the previous two years to include number of graduates and graduation rates.

N/A

- 9. Will this program reduce enrollments in other programs at your institution? If so, please explain.**

No – The Aerospace Technology program will have a fulltime benefited “Navigator” who will recruit

and assist students with student services needs coming in and through the program, and employment assistance as they complete the program. The navigator will be adding to the overall student enrollment at NIC.

- 10. Provide verification of state workforce needs such as job titles requiring this degree.** Include State and National Department of Labor research on employment potential. *This question is not applicable to requests for discontinuance.*

Using the chart below indicate the total projected job openings (including growth and replacement demands in your regional area, the state, and nation. Job openings should represent positions which require graduation from a program such as the one proposed. Data should be derived from a source that can be validated and must be no more than two years old. *This question is not applicable to requests for discontinuance.*

Employment in aviation maintenance and advanced manufacturing is growing rapidly in north Idaho, requiring a highly skilled workforce for aerospace jobs. IDOL reported 16% growth in aerospace industry employment in north Idaho from 2008-2009, during the height of the recession (Source: Idaho Department of Labor 2010). Aerospace employers in north Idaho estimate over 600 new jobs in the next two to three years (Source: Economic Modeling Specialists, Inc.).

Manufacturing	Year 1 - 2013	Year 2 - 2014	Year 3 - 2015	Total	% Change (2013-2015)
Region	7,539	7,664	7,792	22,995	3.4%
State	56,245	56,305	56,556	169,106	0.6%
Nation	11,566,370	11,373,564	11,256,336	34,196,270	-2.7%

Source: EMSI, Covered Employment 2013.1

NAICS codes: See list below

Advanced Manufacturing	Year 1 - 2013	Year 2 - 2014	Year 3 - 2015	Total	% Change (2013-2015)
Region	7,539	7,664	7,792	22,995	3.4%
State	56,245	56,305	56,556	169,106	0.6%
Nation	11,566,370	11,373,564	11,256,336	34,196,270	-2.7%

Source: EMSI, Covered Employment 2013.1

NAICS codes: 336411, 336412, 336413

Aircraft Maintenance	Year 1 - 2013	Year 2 - 2014	Year 3 - 2015	Total	% Change (2013-2015)
Region	225	232	238	695	5.8%
State	329	342	353	1,024	7.3%
Nation	423,765	425,587	427,739	1,277,091	0.9%



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- a. Describe the methodology used to determine the projected job openings. If a survey of employment needs was used, please attach a copy of the survey instrument with a summary of results as **Appendix C**.

North Idaho College utilized Survey Monkey as the instrument used to conduct the industry needs assessment survey. The survey was required as part of the DOL grant application requirements and included collecting information related to industry information, employment forecasts, training gaps, skills need assessments, and other data needed to develop the actual proposal. The survey was sent to members of the Idaho Aerospace Alliance and other industry representatives who expressed interest and/or are existing industry partners of NIC.

- b. Describe how the proposed change will act to stimulate the state economy by advancing the field, providing research results, etc.

To determine the projected job openings NIC collaborated with the Idaho Aerospace Alliance (IDA), a statewide organization established in 2011 to promote and expand the Idaho economy, the Idaho Department of Labor, and individual industry employers to identify and determine workforce needs.

The Idaho Aerospace Alliance is comprised of aviation and an aerospace related company committed to growing the industry sectors and has strategic partnerships with education, government and the public workforce system. The Idaho Aerospace Alliance assisted NIC in the identification of job openings, skills and qualification needed for employment, provide subject matter expertise, serve as industry representatives, and future program advisory board members. They have also committed to donating equipment for the program to prepare students for jobs such as aircraft maintenance technicians, machinists, composite fabricators, or quality assurance technicians.

The Idaho Department of Labor provided employment forecasts for the aerospace, manufacturing, advanced manufacturing and machining industries which indicate an increase in employment opportunities, projecting 9.5% from 2010 to 2015 and 20% from 2010 to 2020. The estimated direct economic impact is \$24.7 million, with an annual impact of \$28.8 million (Source: Economic Modeling Specialists, Inc.).

In addition to the calculated employment projections provided by the Idaho Department of Labor, a survey and individual interviews with regional industry employers confirmed the employment projections provided by the Idaho Department of Labor and revealed additional employment opportunities with the local aerospace companies. NIC utilized Survey Monkey as the instrument used to conduct an industry needs assessment as required by the U.S. Department of Labor grant requirements. In addition to individual interviews with regional employers, the survey collected information related to industry such as employment forecasts, training gaps, skills need assessments, and other data needed to develop the actual grant proposal. The survey was sent to members of the Idaho Aerospace Alliance and other industry representatives who expressed interest and/or are existing industry partners of NIC.

Industry employers around the region have identified skills and credentials needed to qualify individuals for employment in their firms. Aviation maintenance technicians require Federal Aviation Administration (FAA) industry credentials. Aerospace manufacturing workers require composite knowledge, Computer Numeric Control (CNC) programming and machining skills, industry certification in non-destructive testing (NDT) and quality assurance standards, and basic manufacturing skills such as blueprint reading and safety.<sup>1</sup> Additionally, basic skills such as math, reading, writing and computer literacy were identified as lacking within the current workforce.

Based on evidence of overwhelming need, NIC will focus its program efforts on initiating and expanding training and educational opportunities in aviation maintenance and aerospace manufacturing. Occupations aligned with these programs include FAA-certified aircraft maintenance technicians, aerospace assembly mechanics; machinists, computer numerical control (CNC) operators and programmers, composite fabricators and repair technicians, nondestructive testing technicians, and quality assurance technicians.

- c. Is the program primarily intended to meet needs other than employment needs, if so, please provide a brief rationale.

No

- 11. Will any type of distance education technology be utilized in the delivery of the program on your main campus or to remote sites? Please describe. This question is not applicable to requests for discontinuance.**

Students will participate in a blended learning environment. Some courses are delivered in an online delivery format.

Students will be able to complete the Aerospace Core Postsecondary technical certificate completely online before coming to our Aerospace Center of Excellence – an off campus site, to complete the lecture lab courses. Plans to offer some of these lab courses are being considered for NIC's outreach center in Sandpoint, ID. Sandpoint serves many of our northern students and is centered perfectly to assist students who cannot drive to Coeur d Alene.

- 12. Describe how this request is consistent with the State Board of Education's strategic plan and institution's role and mission. This question is not applicable to requests for discontinuance.**

STATE BOARD OF EDUCATION GOAL	PROGRAM GOAL
<b>GOAL 1: A WELL EDUCATED CITIZENRY</b> <i>The educational system will provide opportunities for individual advancement.</i> <b>Objective A: Access</b> - Set policy and advocate for increasing access for individuals of all ages, abilities, and economic means to Idaho's P-20 educational system.	Federally funded program with preference for veterans and TAA eligible students. Program has funding for four years.

<b>Objective B: Higher Level of Educational Attainment</b> – Increase the educational attainment of all Idahoans through participation and retention in Idaho's educational system. Percent of Idahoans (ages 25-34) who have a college degree or certificate.	Program outcomes for students to have earned a certificate – 456 students in three years.
<b>Objective D: Transition</b> – Improve the ability of the educational system to meet educational needs and allow students to efficiently and effectively transition into the workforce	Program outcomes for students entering into the workforce and earning a living wage – 307 in three years.
<b>GOAL 2: CRITICAL THINKING AND INNOVATION</b> The educational system will provide an environment for the development of new ideas, and practical and theoretical knowledge to foster the development of individuals who are entrepreneurial, broadminded, think critically, and are creative. <b>Objective A: Critical Thinking, Innovation and Creativity</b> – Increase research and development of new ideas into solutions that benefit society	Federally funded grant for \$2.97 million dollars to offset the cost of starting this program and developing curriculum. Students will take general education core courses. The knowledge, skills, and abilities required to work in the aerospace industry are high-level and rigorous.

13. Describe how this request fits with the institution's vision and/or strategic plan. This question is not applicable to requests for discontinuance.

Goals of Institution Strategic Mission	Proposed Program Plans to Achieve the Goal
<p>Mission: North Idaho College meets the diverse educational needs of students, employers, and the northern Idaho communities it serves through a commitment to student success, educational excellence, community engagement, and lifelong learning.</p> <p>The three goals of this mission are:</p> <ul style="list-style-type: none"> <li>• <u>Student Success</u> - A vibrant, lifelong learning environment that engages students as partners in achieving educational goals to enhance their quality of life</li> <li>• <u>Educational Excellence</u> - High academic standards, passionate and skillful instruction, professional development, and innovative programming while continuously improving all services and outcomes</li> <li>• <u>Community Engagement</u> -</li> </ul>	<p>The Aerospace program supports the general mission of the college by:</p> <ul style="list-style-type: none"> <li>• Increasing access to educational opportunities for its students.</li> <li>• Responding to employer demand for graduates in a range of specializations.</li> <li>• Expanding the ability of North Idaho College to respond to the economic and workforce development needs in northern Idaho.</li> </ul> <p><b>NIC Strategic Goals:</b> NIC 2012-2016 Strategic Plan:</p> <p><b>Goal 2 - Educational Excellence, Objective 1:</b> Evaluate, create, and adapt programs that respond to the educational and training needs of the region.</p> <p>The new Aerospace program will meet emerging needs in Northern Idaho. Employment in aviation maintenance and advanced manufacturing is growing rapidly in northern Idaho, requiring a highly skilled workforce for aerospace jobs. IDOL reported 16% growth in aerospace industry employment in northern Idaho from 2008-2009, during the height of the recession. Aerospace employers in northern Idaho estimate over 600 new jobs through 2016.</p> <p><b>Goal 3 - Community Engagement, Objective 1:</b> Advance and nurture relationships throughout our service region to enhance the lives of the citizens and students we serve.</p>

<p>Collaborative partnerships with businesses, organizations, community members, and educational institutions to identify and address changing educational needs</p>	<p>The Aerospace program is working with several local partners including Empire Airlines, the Coeur d'Alene Airport, LA Aluminum Casting Company, Tamarack Aerospace Group, and Aerocet, Inc. These partners are committed to acting as industry advisors, providing work-based learning activities, and helping to secure donations and matching resources.</p> <p><b>Goal 3 – Community Engagement, Objective 2:</b> Demonstrate commitment to the economic/business development of the region.</p> <p>In 2011, the Idaho Aerospace Alliance (IDA) was formed to promote and expand the Idaho economy. IDA is comprised of aviation and aerospace related companies committed to growing the industry sector. The IDA endorses NIC's Aerospace program and will assist with identification of job openings, skills and qualifications needed for employment, and act as subject matter experts, industry representatives and advisory board members.</p> <p><b>Goal 5 – Stewardship, Objective 1:</b> Exhibit trustworthy stewardship of resources.</p> <p>In addition to the \$2.9 million grant, in order to minimize costs, the program will utilize community partnerships to secure fiscal and in-kind resources to assist in sustaining program activities. Since the curricula must remain sensitive to the evolving industry, NIC will solicit employers to invest their training budgets into the aerospace programs thereby reducing program and service replication. Tuition dollars, state funding, and industry and NIC Foundation support will sustain funding beyond the life of the grant. Please see webpages for the full <a href="#">North Idaho College Strategic Plan</a>.</p>
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**14. Is the proposed program in your institution's Five-Year plan? Indicate below.** *This question is not applicable to requests for discontinuance.*

Yes ☒ No ☐

This program is listed on the five year plan. We have changed the name from Aviation Maintenance Technology to Aerospace Technology as a result of the DOL TAACCCT grant award that funds aerospace manufacturing as well as aviation maintenance education.

If not on your institution's Five-Year plan, provide a justification for adding the program.  
N/A

**15. Explain how students are going to learn about this program and where students are going to be recruited from (i.e., within institution, out-of-state, internationally).** *For request to discontinue program, how will continuing students be advised of impending changes and consulted about options or alternatives for attaining their educational goals?*

Students learn about this program through instructor visits to area high schools, advisory members, former students, special events such as career fairs and a local event called Hard Hats, Hammers, and Hot Dogs which is sponsored by local industry and North Idaho College. Recruiting efforts are focused primarily on the five northern counties of Idaho, veterans and TAA eligible students.

Students in transition programs, such as IBEST will also be recruited. The program has an IBEST delivery model of instruction where these students are proven to be successful.

16. **Program Resource Requirements.** Using the Excel spreadsheet provided by the Office of the State Board of Education, provide a realistic estimate of costs needed for the overall program. This should only include the additional costs that will be incurred and not current costs. Include both the reallocation of existing resources and anticipated or requested new resources. Second and third year estimates should be in constant dollars. If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies). Provide an explanation of the fiscal impact of the proposed discontinuance to include impacts to faculty (i.e., salary savings, re-assignments).

The college is committed to sustaining the Aerospace Center of Excellence beyond the life of the four year grant with tuition dollars, state funding (both annual allocations and special grants) and through industry and NIC Foundation support. When the four year grant is complete, North Idaho College will work in collaboration with the Professional Technical Education division to identify potential sources of funding. In addition, North Idaho College will look at opportunities to reallocate funds within the NIC PTE division and will continue to seek grant opportunities.

***Excel Spreadsheet Attached***

# North Idaho College

**Program Reallocate Requirements.** Provide a realistic estimate of costs needed for the overall program. This should only include the additional costs that will be incurred and not current costs. Include both the reallocation of existing resources and anticipated or requested new resources. Second and third year estimates should be in constant dollars. If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies). Provide an explanation of the fiscal impact of the proposed discontinuance to include impacts to faculty (i.e., salary savings, re-assignments).

## A. REVENUE

	FY	2014	FY	2015	FY	2016	Cumulative Total
	On-going	One-time	On-going	One-time	On-going	One-time	On-going
1. Appropriated (Reallocation)							\$0.00
2. Appropriated (New)							\$0.00
3. Federal							\$0.00
4. Tuition							\$0.00
5. Student Fees							\$0.00
6. Other (Specify) Federal Grant		\$1,251,888.00		\$789,281.00		\$801,428.00	\$2,842,597.00
<b>Total Revenue</b>	\$0.00	\$1,251,888.00	\$0.00	\$789,281.00	\$0.00	\$801,428.00	\$2,842,597.00

## B. EXPENDITURES

	FY	2014	FY	2015	FY	2016	Cumulative Total
	On-going	One-time	On-going	One-time	On-going	One-time	On-going
1. Personnel		\$594,488.00		\$607,381.00		\$619,528.00	\$1,821,397.00
2. Operating		\$44,400.00		\$44,400.00		\$44,400.00	\$133,200.00
3. Equipment		\$513,000.00		\$37,500.00		\$37,500.00	\$588,000.00
4. Facilities		\$49,000.00		\$49,000.00		\$49,000.00	\$147,000.00
5. Other (Specify) External Evaluator		\$51,000.00		\$51,000.00		\$51,000.00	\$153,000.00
<b>Total Expenditures</b>	\$0.00	\$1,251,888.00	\$0.00	\$789,281.00	\$0.00	\$801,428.00	\$2,842,597.00
<b>Net Income (Deficit)</b>	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Ongoing is defined as ongoing operating budget for the program which will become part of the base.

One-time is defined as one-time funding in a fiscal year and not part of the base.

## PTE ATTACHMENT B

Please submit a separate PTE Attachment B for each option, certificate, or degree.

<b>Institution:</b>	<u>North Idaho College</u>
<b>Program/Option Title:</b>	<u>Aerospace Technology – AEROSPACE COMPOSITE TECHNICIAN</u> <i>Insert Program Name/Option Title (i.e. Business Technologies/Marketing and Management)</i>
<b>Degree/Certificate:</b>	<u>Technical Certificate</u> <i>If a Certificate, indicate type (i.e. Technical, Advanced Technical or Postsecondary Technical)</i>
<b>CIP Code Number</b>	<u>15.0801</u>
<b>CIP Code Title</b>	<u>Aerospace Manufacturing Technology</u>
<b>TSA</b>	<u>To be determined</u>

## STUDENT LEARNING OUTCOMES

List the student learning outcomes for the program.

Students will demonstrate the skills and knowledge necessary to work in various entry-level positions in composite fabrication and composite quality assurance for the aerospace industry, to include:

1. Demonstrate knowledge of personal and aircraft safety standards related to shop layout, equipment use, and the handling and storage of materials.
2. Operate tools and equipment safely.
3. Read and accurately interpret aircraft blueprints.
4. Define and utilize composite terminology.
5. Consistently display precision manufacturing processes such as measuring, drilling, and fabricating components.
6. Demonstrate appropriate use of cutting tools.
7. Attach fasteners, metal components, brackets, and fittings to composite materials with precision.
8. Demonstrate proper care of composite materials and tools.

9. Fabricate and repair composites using industry recognized techniques.
10. Apply quality assurance techniques to composite processes.
11. Demonstrate the skills and knowledge necessary to repair composites used in the aerospace industry.
12. Demonstrate knowledge of grounding theory, and the proper techniques for fine quality control when performing electrical bonding.
13. Identify and interpret basic Geometric Dimensioning and Tolerancing symbols.
14. Function effectively within diverse groups of individuals by working within team structures on various lab projects and assignments.
15. Use a computer to word process and access the Internet.
16. Demonstrate basic computation and communications skills when performing the job functions required of an aerospace composite technician.

Answer the following questions in the category/ies that apply:

### **NEW PROGRAM OR OPTION**

1. Describe the impact this change will have on students currently enrolled in the existing program.

No students are currently enrolled in this program. This will be a new program to North Idaho College.

2. Describe the discussion with PTE and the TCLC regarding this change.

North Idaho College's PTE division and Curriculum Council are in full support of the Aerospace Technology program and the Aerospace Composite Technician Technical Certificate. The Aerospace program is part of NIC's five-year program plan filed with the State. The State Division of PTE was notified when NIC received the grant.

3. Provide advisory committee/industry input supporting this change.

The Aerospace Industry in North Idaho has written letters of support for NIC to begin an Aerospace Technology program to provide a much needed skilled work force. Industry partners sit on the advisory committee who helped establish learning outcomes and guide the program development. These industry partners will continue to provide input as we develop further components for the program into the future. It is the intent that students will be provided the skills to meet the rigorous aerospace industry standards.

4. What is your plan to mitigate the impact this change will have on (1) similar secondary programs and (2) advanced learning opportunities?

North Idaho College does not currently have any programs that would compete with Aerospace Technology and/or composite fabrication. The State of Idaho does not currently have a similar program.

Advanced learning opportunities will come with the ability to obtain stackable certificates and ultimately an Associate of Applied Science degree (to be developed in the future). The Aerospace Composite Technology program provides in-depth instruction in the processes involved in the development and production of aircraft composites. Students will gain skills in assembly, finish work, fabrication, disassembly, complex repair techniques, and inspection of composites for quality assurance. Students will have the opportunity to receive stackable certificates which will allow for them to exit into the workforce at various points.

Students may enroll and elect to continue in the following sequence:

- Aerospace Core Postsecondary Technical Certificate; continuing on to the
- Aerospace Composite Fabrication Postsecondary Technical Certificate program; continuing on to the
- Aerospace Composite Repair/Quality Assurance Postsecondary Technical Certificate program.
- Aerospace Composite Technician Technical Certificate is achieved upon completion of all program components.

### NON-SUBSTANTIVE CHANGE

(Changes to a program name or title changes (e.g., programs, degrees, certificates, departments, divisions, colleges, or centers), Course number/prefix change, Course title change, Credit/lab/contact hour change, Semester offered change, Catalog description change, Co-/Prerequisite change, Create new Course (s), Delete existing course.)

1. Describe the impact this change will have on students currently enrolled in the existing program.  
N/A
2. Provide advisory committee/industry input supporting this change.  
N/A
3. What is your plan to mitigate the impact this change will have on (1) similar secondary programs and (2) advanced learning opportunities?  
N/A

## COURSE SEQUENCE

<b>FIRST SEMESTER (15 Weeks)</b>			
<b>AEROSPACE COMPOSITE TECHNICIAN TECHNICAL CERTIFICATE</b>			
<b>Course Prefix &amp; Number</b>	<b>Course Title</b>	<b>Credits</b>	<b>Gen Ed/ Technical</b>
AERO 110	Safety/OSHA	1	Tech
AERO 111	Blueprint Reading	2	Tech
MATH 022	Technical Math	3	Gen Ed
AERO 120	Introduction to Composites	3	Tech
AERO 121	Composite Finish Trim	1	Tech
AERO 122	Composite Assembly	2	Tech
AERO 123	Composite Fabrication Methods/ Application	2	Tech
AERO 130	Disassembly & Damage Removal/ Techniques	1	Tech
<b>Total</b>		<b>15</b>	

<b>SECOND SEMESTER (15 Weeks)</b>			
<b>AEROSPACE COMPOSITE TECHNICIAN TECHNICAL CERTIFICATE</b>			
<b>Course Prefix &amp; Number</b>	<b>Course Title</b>	<b>Credits</b>	<b>Gen Ed/ Technical</b>
AERO 140	Introduction to Quality Assurance	3	Tech
ENGL 099	Fundamentals for Writing	3	Gen Ed
AERO 131	Composite Repair	2	Tech
AERO 132	Complex Composite Repair	1	Tech
AERO 133	Electrical Bonding Repair	1	Tech
AERO 141	Geometric Dimensioning & Tolerance	1	Tech
AERO 142	Composite Inspection	1	Tech
<b>Total</b>		<b>12</b>	

<b>Program Summary (30 Weeks)</b>	
General (Academic) Education	<b>6</b>
Technical Credits	<b>21</b>
Grand Total	<b>27</b>

## COURSE TITLES, DESCRIPTIONS AND CREDITS

List all technical course titles, descriptions, and credits for this program.

**AERO 110 Safety/OSHA.** This course provides an in-depth study of the safety practices required for work in aviation and manufacturing fields. Topics include: introduction to OSHA regulations; safety tools, equipment, and use procedures; hazardous waste; and first aid and cardiopulmonary resuscitation.

**Credit: 1**

**Lecture:** 1 hour per week

**Prerequisite:** Must be enrolled in NIC Aerospace program.

**AERO 111 Blue Print Reading.** This course builds basic aircraft blueprint reading skills. Topics will include: lines and symbols, orthographic drawings, views, material, form and position, title blocks, sketching, features, and sections. Students will learn a systematic approach to reading aircraft blue prints through actual manipulation of working drawings.

**Credits: 2**

**Lecture:** 2 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program.

**ENGL-099 Fundamentals for Writing-** ENGL-099 provides writing instruction that focuses on fluency, development, organization, revision, and editing/proofreading. As a part of this course, students will practice reading actively and critically, engaging in dialogues with texts, drafting essays in a format appropriate to purpose and audience, and utilizing a process approach to writing. A grade of C- or above allows the student to enroll in ENGL-101.

**Credits: 3**

**Lecture:** 3 hours per week

**Prerequisite:** Entry is based on an appropriate score on the placement test of either between 31-67 on the COMPASS Writing, or between 15-17 on the ACT English, or between 380-440 on the SAT Verbal, **OR** a grade of C- or above in ENGL-045

**MATH-022 Technical Mathematics for Machining and Computer Aided Design Technologies** This course is designed as a basic math course for students in the technical programs of Machining and CNC Technology and Computer Aided Design Technology. Appropriate applications for those specific technical programs will be stressed throughout. The course will review calculator usage and explore plane and angular geometry, congruent and similar figures, circles, applications or right-triangle trigonometry, Law of Sines and Law of Cosines, vectors, and trigonometric functions.

**Credits: 3**

**Lecture:** 3 hours per week

**Prerequisite:** Entry is based on an appropriate score on the placement test, either COMPASS Pre-Algebra > 32 or a grade of C- or above in MATH-015. These scores are under review—refer to the online catalog for up-to-date information.

**AERO 120 Introduction to Composites.** Introduction to Composites is an introductory course into the materials and processes associated with polymer composite structures, components and design. Emphasis will be placed on material properties, manufacturing processes and safety. Hands-on lab activities will supplement classroom content.

**Credits: 3**

**Lecture:** 3 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program

**AERO 121 Composite Finish and Trim.** This course provides students with an understanding of the processes used to finish trim composites parts. Topics include safety, documentation, tools, procedures and inspection. Skills learned in theory sessions are transferred to the lab through projects.

**Credits: 1**

**Lecture/Lab:** 2 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program and concurrently enrolled in or have completed AERO 120 with 2.0 grade or better.

**AERO 122 Composite Assembly.** This course teaches the fundamentals of joining composite structures. Adhesive bonding as well as mechanical fasteners is covered. Safety procedures are emphasized. Essential elements of this course include the preparation of holes for mechanical fasteners and surface preparation for adhesive bonding. The course consists of theory and practical application and through hands-on projects.

**Credits: 2**

**Lecture/Lab:** 4 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program and concurrently enrolled in or have completed AERO 120 with 2.0 grade or better.

**AERO 123 Composite Fabrication Methods & Applications.** This course teaches the fundamentals of composite structure fabrication methods. Processes will be applied including hand lay-up, bonding, vacuum bagging and resin transfer molding. Emphasis will also be placed on composites safety and inspection/testing of composite components.

**Credits: 2**

**Lecture/Lab:** 4 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program and concurrently enrolled in or have completed AERO 120 with 2.0 grade or better.

**AERO 130 Disassembly & Damage Removal Technique.** This course provides students with the knowledge required to safely and effectively prepare a part for repair. In the laboratory setting, students will learn to effectively remove finish and disassemble and remove damaged composite material. Special attention is paid to developing students' tactile skills in all of these areas.

**Credits: 1**

**Lecture/Lab:** 2 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program and concurrently enrolled in or have completed AERO 120 with 2.0 grade of better.

**AERO-131 Composite Repair-** This course provides students with the knowledge and techniques used in structural repairs of aircraft made with composite materials. Students complete multiple industry-based projects designed to challenge their skills with both wet lay-up and pre-preg materials.

**Credits: 2**

**Lecture/Lab:** 4 hours per week

**Prerequisite:** Must be in an Aerospace program, Enrolled in or completed AERO-101 with 2.0 grade of better.

**AERO 132 Complex Composite Repair.** This course provides students with hands-on experience working with nonstructural composite repairs. Instruction includes learning how to solve problems presented in non-production atmospheres in relation to composite repairs. Students also review case studies and problem-solving models.

**Credits: 1**

**Lecture/Lab:** 2 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program and concurrently enrolled in or have completed AERO 120 with 2.0 grade of better.

**AERO 133 Electrical Bonding Repair.** This course provides students with the knowledge and skills used in electrical bonding composite repair. Students learn theory and application using secondary bonding techniques.

**Credits: 1**

**Lecture/Lab:** 2 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program and concurrently enrolled in or have completed AERO 120 with 2.0 grade of better.

**AERO 140 Introduction to Quality Assurance.** This course is designed to provide general familiarization with aircraft systems and processes. Topics include introduction to aircraft systems, aerospace regulations, Electrostatic Discharge (ESD), conformity, and process improvement. This course is designed to provide entry-level quality control technicians with the hands-on experience they will need to inspect and document aircraft systems and processes. Topics include introduction to documentation procedures, and verification of aircraft systems.

**Credits: 3**

**Lecture:** 3 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program.

**AERO 141 Geometric Dimensioning & Tolerance.** This course provides an understanding of the basic terms and principles of Geometric Dimensioning and Tolerancing (GD&T). The course provides students with the skills and knowledge necessary to identify GD&T symbols and how to interpret those symbols.

**Credits: 1**

**Lecture/Lab:** 2 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program and concurrently enrolled in or have completed AERO 120 with 2.0 grade or better.

**AERO 142 Composite Inspection.** This course provides students with an understanding of the inspection process during repair procedures. Students learn the role of repair technicians in the inspection process while obtaining hands-on experience in basic Non-Destructive Testing techniques (NDT). Emphasis is placed on the importance of documentation and verification when inspecting repairs.

**Credits: 1**

**Lecture/Lab:** 2 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program and concurrently enrolled in or have completed AERO 120 with 2.0 grade or better.

## PTE ATTACHMENT B

Please submit a separate PTE Attachment B for each option, certificate, or degree.

<b>Institution:</b>	<b>North Idaho College</b>
<b>Program/Option Title:</b>	<b>Aerospace Technology – AEROSPACE CORE</b> <i>Insert Program Name/Option Title (i.e. Business Technologies/Marketing and Management)</i>
<b>Degree/Certificate:</b>	<b>Postsecondary Technical Certificate</b> <i>If a Certificate, indicate type (i.e. Technical, Advanced Technical or Postsecondary Technical)</i>
<b>CIP Code Number</b>	<b>15.0801</b>
<b>CIP Code Title</b>	<b>Aerospace Manufacturing Technology</b>
<b>TSA</b>	<b>To be determined</b>

## STUDENT LEARNING OUTCOMES

List the student learning outcomes for the program.

- Demonstrate knowledge of personal and aircraft safety standards related to shop layout, equipment use, and the handling and storage of materials.
- Operate tools and equipment safely.
- Read and accurately interpret aircraft blueprints.
- Define and utilize composite terminology.
- Use a computer to word process and access the Internet.
- Demonstrate basic computation and communications skills when performing the job functions required of an aerospace composite technician.

Answer the following questions in the category/ies that apply:

## NEW PROGRAM OR OPTION

1. Describe the impact this change will have on students currently enrolled in the existing program.

No students are currently enrolled in this program. This will be a new program to North Idaho College.

2. Describe the discussion with PTE and the TCLC regarding this change.

North Idaho College's PTE division and Curriculum Council are in full support of the Aerospace Technology program and the Postsecondary Technical Certificate in Aerospace Core. The Aerospace program is part of NIC's five-year program plan filed with the State. The State Division of PTE was notified when NIC received the grant.

3. Provide advisory committee/industry input supporting this change.

The Aerospace Industry in North Idaho has written letters of support for NIC to begin an Aerospace Technology program to provide a much needed skilled work force. Industry partners sit on the advisory committee who helped establish learning outcomes and guide the program development. These industry partners will continue to provide input as we develop further components for the program into the future. It is the intent that students will be provided the skills to meet the rigorous aerospace industry standards.

4. What is your plan to mitigate the impact this change will have on (1) similar secondary programs and (2) advanced learning opportunities

North Idaho College does not currently have any programs that would compete with Aerospace Technology and/or composite fabrication. The State of Idaho does not currently have a similar program.

Advanced learning opportunities will come with the ability to obtain stackable certificates and ultimately an Associate of Applied Science degree (to be developed in the future). The Aerospace Core Technology program provides in-depth instruction in the processes involved in the development and production of aircraft composites. Students will gain skills in assembly, finish work, fabrication, disassembly, complex repair techniques, and inspection of composites for quality assurance. Students will have the opportunity to receive stackable certificates which will allow for them to exit into the workforce at various points.

Students may enroll and elect to continue in the following sequence:

- Aerospace Core Postsecondary Technical Certificate; continuing on to the
- Aerospace Composite Fabrication Postsecondary Technical Certificate program; continuing on to the
- Aerospace Composite Repair/Quality Assurance Postsecondary Technical Certificate program.
- Aerospace Composite Technician Technical Certificate is achieved upon completion of all program components.

**NON-SUBSTANTIVE CHANGE**

(Changes to a program name or title changes (e.g., programs, degrees, certificates, departments, divisions, colleges, or centers), Course number/prefix change, Course title change, Credit/lab/contact hour change, Semester offered change, Catalog description change, Co-/Prerequisite change, Create new Course (s), Delete existing course.)

1. Describe the impact this change will have on students currently enrolled in the existing program.  
N/A
2. Provide advisory committee/industry input supporting this change.  
N/A
3. What is your plan to mitigate the impact this change will have on (1) similar secondary programs and (2) advanced learning opportunities?  
N/A

**COURSE SEQUENCE****AEROSPACE CORE POSTSECONDARY TECHNICAL CERTIFICATE**

These four core competency courses are required as part of the Aerospace Composite Technician program. They may be taken as a standalone certificate of completion before entering the Aerospace Composite Postsecondary certificate program or taken simultaneously.

<b>FIRST SEMESTER (15 Weeks)</b> <b>AEROSPACE TECHNOLOGY – AEROSPACE CORE</b> <b>POSTSECONDARY TECHNICAL CERTIFICATE</b>			
<b>Course Prefix &amp; Number</b>	<b>Course Title</b>	<b>Credits</b>	<b>Gen Ed/ Technical</b>
AERO 110	Safety/OSHA	1	Tech
AERO 111	Blueprint Reading	2	Tech
MATH 022	Technical Math	3	Gen Ed
AERO 120	Introduction to Composites	3	Tech
<b>Total</b>		<b>9</b>	

<b>Summary (15 Weeks)</b>	
General (Academic) Education	<b>3</b>
Technical Credits	<b>6</b>
Grand Total	<b>9</b>

## COURSE TITLES, DESCRIPTIONS AND CREDITS

List all technical course titles, descriptions, and credits for this program.

**AERO 110 Safety/OSHA.** This course provides an in-depth study of the safety practices required for work in aviation and manufacturing fields. Topics include: introduction to OSHA regulations; safety tools, equipment, and use procedures; hazardous waste; and first aid and cardiopulmonary resuscitation.

**Credit: 1**

**Lecture:** 1 hour per week

**Prerequisite:** Must be enrolled in NIC Aerospace program

**AERO 111 Blue Print Reading.** This course builds basic aircraft blueprint reading skills. Topics will include: lines and symbols, orthographic drawings, views, material, form and position, title blocks, sketching, features, and sections. Students will learn a systematic approach to reading aircraft blueprints through actual manipulation of working drawings.

**Credits: 2**

**Lecture:** 2 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program

**AERO 120 Introduction to Composites.** Introduction to Composites is an introductory course into the materials and processes associated with polymer composite structures, components and design. Emphasis will be placed on material properties, manufacturing processes and safety. Hands-on lab activities will supplement classroom content.

**Credits: 3**

**Lecture:** 3 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program

**MATH 022 Technical Mathematics for Machining and Computer Aided Design Technologies.** This course is designed as a basic math course for students in the technical programs of Machining and CNC Technology and Computer Aided Design Technology. Appropriate applications for those specific technical programs will be stressed throughout. The course will review calculator usage and explore plane and angular geometry, congruent and similar figures, circles, applications or right-triangle trigonometry, Law of Sines and Law of Cosines, vectors, and trigonometric functions.

**Credits: 3**

**Lecture:** 3 hours per week

**Prerequisite:** Entry is based on an appropriate score on the placement test, either COMPASS Pre-Algebra > 32 or a grade of C- or above in MATH-015. These scores are under review—refer to the online catalog for up-to-date information.

## PTE ATTACHMENT B

Please submit a separate PTE Attachment B for each option, certificate, or degree.

<b>Institution:</b>	<b>North Idaho College</b>
<b>Program/Option Title:</b>	<b>Aerospace Technology – AEROSPACE COMPOSITE FABRICATION</b>
	<i>Insert Program Name/Option Title (i.e. Business Technologies/Marketing and Management)</i>
<b>Degree/Certificate:</b>	<b>Postsecondary Technical Certificate</b>
	<i>If a Certificate, indicate type (i.e. Technical, Advanced Technical or Postsecondary Technical)</i>
<b>CIP Code Number</b>	<b>15.0801</b>
<b>CIP Code Title</b>	<b>Aerospace Manufacturing Technology</b>
<b>TSA</b>	<b>To be determined</b>

## STUDENT LEARNING OUTCOMES

List the student learning outcomes for the program.

Students will demonstrate the skills and knowledge necessary to work in various entry-level phases of the composite fabrication industry, to include:

- Demonstrate knowledge of personal and aircraft safety standards related to shop layout, equipment use, and the handling and storage of materials.
- Operate tools and equipment safely.
- Read and accurately interpret aircraft blueprints.
- Define and utilize composite terminology.
- Consistently display precision manufacturing processes such as measuring, drilling, and fabricating components.
- Demonstrate appropriate use of cutting tools.
- Attach fasteners, metal components, brackets, and fittings to composite materials with precision.
- Demonstrate proper care of composite materials.

- Function effectively within diverse groups of individuals by working within team structures on various lab projects and assignments.
- Use a computer to word process and access the Internet.
- Demonstrate basic computation and communications skills when performing the job functions required of an aerospace composite technician.

Answer the following questions in the category/ies that apply:

### NEW PROGRAM OR OPTION

1. Describe the impact this change will have on students currently enrolled in the existing program.

No students are currently enrolled in this program. This will be a new program to North Idaho College.

2. Describe the discussion with PTE and the TCLC regarding this change.

North Idaho College's PTE division and Curriculum Council are in full support of the Aerospace Technology program and the Postsecondary Technical Certificate in Composite Fabrication. The Aerospace program is part of NIC's five-year program plan filed with the State. The State Division of PTE was notified when NIC received the grant.

3. Provide advisory committee/industry input supporting this change.

The Aerospace Industry in North Idaho has written letters of support for NIC to begin an Aerospace Technology program to provide a much needed skilled work force. Industry partners sit on the advisory committee who helped establish learning outcomes and guide the program development. These industry partners will continue to provide input as we develop further components for the program into the future. It is the intent that students will be provided the skills to meet the rigorous aerospace industry standards.

4. What is your plan to mitigate the impact this change will have on (1) similar secondary programs and (2) advanced learning opportunities?

North Idaho College does not currently have any programs that would compete with Aerospace Technology and/or composite fabrication. The State of Idaho does not currently have a similar program.

Advanced learning opportunities will come with the ability to obtain stackable certificates and ultimately an Associate of Applied Science degree (to be developed in the future). The Aerospace Composite Technology program provides in-depth instruction in the processes involved in the development and production of aircraft composites. Students will gain skills in assembly, finish work, fabrication, disassembly, complex repair techniques, and inspection of composites for quality assurance. Students will have the opportunity to receive stackable certificates which will allow for them to exit into the workforce at various points.

Students may enroll and elect to continue in the following sequence:

- Aerospace Core Postsecondary Technical Certificate; continuing on to the
- Aerospace Composite Fabrication Postsecondary Technical Certificate program; continuing on to the
- Aerospace Composite Repair/Quality Assurance Postsecondary Technical Certificate program.
- Aerospace Composite Technician Technical Certificate is achieved upon completion of all program components.

### NON-SUBSTANTIVE CHANGE

(Changes to a program name or title changes (e.g., programs, degrees, certificates, departments, divisions, colleges, or centers), Course number/prefix change, Course title change, Credit/lab/contact hour change, Semester offered change, Catalog description change, Co-/Prerequisite change, Create new Course (s), Delete existing course.)

1. Describe the impact this change will have on students currently enrolled in the existing program.

N/A

2. Provide advisory committee/industry input supporting this change.

N/A

3. What is your plan to mitigate the impact this change will have on (1) similar secondary programs and (2) advanced learning opportunities?

N/A

## COURSE SEQUENCE

<b>FIRST SEMESTER (15 Weeks)</b> <b>AEROSPACE COMPOSITE FABRICATION</b> <b>POSTSECONDARY TECHNICAL CERTIFICATE</b>			
<b>Course Prefix &amp; Number</b>	<b>Course Title</b>	<b>Credits</b>	<b>Gen Ed/ Technical</b>
AERO 110	Safety/OSHA	1	Tech
AERO 111	Blueprint Reading	2	Tech
MATH 022	Technical Math	3	Gen Ed
AERO 120	Introduction to Composites	3	Tech
AERO 121	Composite Finish Trim	1	Tech
AERO 122	Composite Assembly	2	Tech
AERO 123	Composite Fabrication Methods/ Application	2	Tech
AERO 130	Disassembly & Damage Removal/ Techniques	1	Tech
<b>Total Credits</b>		<b>15</b>	

<b>Summary (15 Weeks)</b>	
General (Academic) Education	<b>3</b>
Technical Credits	<b>12</b>
Grand Total	<b>15</b>

## COURSE TITLES, DESCRIPTIONS AND CREDITS

List all technical course titles, descriptions, and credits for this program.

**AERO 110 Safety/OSHA.** This course provides an in-depth study of the safety practices required for work in aviation and manufacturing fields. Topics include: introduction to OSHA regulations; safety tools, equipment, and use procedures; hazardous waste; and first aid and cardiopulmonary resuscitation.

**Credit: 1**

**Lecture:** 1 hour per week

**Prerequisite:** Must be enrolled in NIC Aerospace program.

**AERO 111 Blue Print Reading.** This course builds basic aircraft blueprint reading skills. Topics will include: lines and symbols, orthographic drawings, views, material, form and position, title blocks, sketching, features, and sections. Students will learn a systematic approach to reading aircraft blueprints through actual manipulation of working drawings.

**Credits: 2**

**Lecture:** 2 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program.

**MATH 022 Technical Mathematics for Machining and Computer Aided Design Technologies.** This course is designed as a basic math course for students in the technical programs of Machining and CNC Technology and Computer Aided Design Technology. Appropriate applications for those specific technical programs will be stressed throughout. The course will review calculator usage and explore plane and angular geometry, congruent and similar figures, circles, applications of right-triangle trigonometry, Law of Sines and Law of Cosines, vectors, and trigonometric functions.

**Credits: 3**

**Lecture:** 3 hours per week

**Prerequisite:** Entry is based on an appropriate score on the placement test, either COMPASS Pre-Algebra > 32 or a grade of C- or above in MATH-015. These scores are under review—refer to the online catalog for up-to-date information.

**AERO 120 Introduction to Composites.** Introduction to Composites is an introductory course into the materials and processes associated with polymer composite structures, components and design. Emphasis will be placed on material properties, manufacturing processes and safety. Hands-on lab activities will supplement classroom content.

**Credits: 3**

**Lecture:** 3 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program

**AERO 121 Composite Finish and Trim.** This course provides students with an understanding of the processes used to finish trim composites parts. Topics include safety, documentation, tools, procedures and inspection. Skills learned in theory sessions are transferred to the lab through projects.

**Credits: 1**

**Lecture/Lab:** 2 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program and concurrently enrolled in or have completed AERO 120 with 2.0 grade or better.

**AERO 122 Composite Assembly.** This course teaches the fundamentals of joining composite structures. Adhesive bonding as well as mechanical fasteners is covered. Safety procedures are emphasized. Essential elements of this course include the preparation of holes for mechanical fasteners and surface preparation for adhesive bonding. The course consists of theory and practical application and through hands-on projects.

**Credits: 2**

**Lecture/Lab:** 4 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program and concurrently enrolled in or have completed AERO 120 with 2.0 grade of better.

**AERO 123 Composite Fabrication Methods & Applications.** This course teaches the fundamentals of opposite structure fabrication methods. Processes will be applied including hand lay-up, bonding, vacuum bagging and resin transfer molding. Emphasis will also be placed on composites safety and inspection/testing of composite components.

**Credits: 2**

**Lecture/Lab:** 4 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program and concurrently enrolled in or have completed AERO 120 with 2.0 grade of better.

**AERO 130 Disassembly & Damage Removal Technique.** This course provides students with the knowledge required to safely and effectively prepare a part for repair. In the laboratory setting, students will learn to effectively remove finish and disassemble and remove damaged composite material. Special attention is paid to developing students' tactile skills in all of these areas.

**Credits: 1**

**Lecture/Lab:** 2 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program and concurrently enrolled in or have completed AERO 120 with 2.0 grade of better.

## PTE ATTACHMENT B

Please submit a separate PTE Attachment B for each option, certificate, or degree.

<b>Institution:</b>	<b>North Idaho College</b>
<b>Program/Option Title:</b>	<b>Aerospace Technology – AEROSPACE COMPOSITE REPAIR AND QUALITY ASSURANCE</b> <i>Insert Program Name/Option Title (i.e. Business Technologies/Marketing and Management)</i>
<b>Degree/Certificate:</b>	<b>Postsecondary Technical Certificate</b> <i>If a Certificate, indicate type (i.e. Technical, Advanced Technical or Postsecondary Technical)</i>
<b>CIP Code Number</b>	<b>15.0801</b>
<b>CIP Code Title</b>	<b>Aerospace Manufacturing Technology</b>
<b>TSA</b>	<b>To be determined</b>

## STUDENT LEARNING OUTCOMES

List the student learning outcomes for the program.

Students will demonstrate the skills and knowledge necessary to work in entry-level quality assurance positions for the composite fabrication industry, to include:

- Fabricate and repair composites using industry recognized techniques.
- Demonstrate the skills and knowledge necessary to repair composites used in the aerospace industry.
- Define and utilize composite terminology.
- Apply quality assurance techniques to composite processes.
- Consistently display precision manufacturing processes such as measuring, drilling, and fabricating components.
- Demonstrate appropriate use of cutting tools.
- Demonstrate knowledge of grounding theory, and the proper techniques for fine quality control when performing electrical bonding.
- Attach fasteners, metal components, brackets, and fittings to composite materials with precision.
- Identify and interpret basic Geometric Dimensioning and Tolerancing symbols.

- Function effectively within diverse groups of individuals by working within team structures on various lab projects and assignments.
- Use a computer to word process and access the Internet.
- Demonstrate basic computation and communications skills when performing the job functions required of an aerospace composite technician.

Answer the following questions in the category/ies that apply:

### NEW PROGRAM OR OPTION

1. Describe the impact this change will have on students currently enrolled in the existing program.

No students are currently enrolled in this program. This will be a new program to North Idaho College.

2. Describe the discussion with PTE and the TCLC regarding this change.

North Idaho College's PTE division and Curriculum Council are in full support of this the Aerospace Technology program and the Postsecondary Technical Certificate in Composite Repair and Quality Assurance. The Aerospace program is part of NIC's five-year program plan filed with the State. The State Division of PTE was notified when NIC received the grant.

3. Provide advisory committee/industry input supporting this change.

The Aerospace Industry in North Idaho has written letters of support for NIC to begin an Aerospace Technology program to provide a much needed skilled work force. Industry partners sit on the advisory committee who helped establish learning outcomes and guide the program development. These industry partners will continue to provide input as we develop further components for the program into the future. It is the intent that students will be provided the skills to meet the rigorous aerospace industry standards.

4. What is your plan to mitigate the impact this change will have on (1) similar secondary programs and (2) advanced learning opportunities?

North Idaho College does not currently have any programs that would compete with Aerospace Technology and/or composite fabrication. The State of Idaho does not

currently have a similar program.

Advanced learning opportunities will come with the ability to obtain stackable certificates and ultimately an Associate of Applied Science degree (to be developed in the future). The Aerospace Composite Technology program provides in-depth instruction in the processes involved in the development and production of aircraft composites. Students will gain skills in assembly, finish work, fabrication, disassembly, complex repair techniques, and inspection of composites for quality assurance. Students will have the opportunity to receive stackable certificates which will allow for them to exit into the workforce at various points.

Students may enroll and elect to continue in the following sequence:

- Aerospace Core Postsecondary Technical Certificate; continuing on to the
- Aerospace Composite Fabrication Postsecondary Technical Certificate program; continuing on to the
- Aerospace Composite Repair/Quality Assurance Postsecondary Technical Certificate program.
- Aerospace Composite Technician Technical Certificate is achieved upon completion of all program components.

### NON-SUBSTANTIVE CHANGE

(Changes to a program name or title changes (e.g., programs, degrees, certificates, departments, divisions, colleges, or centers), Course number/prefix change, Course title change, Credit/lab/contact hour change, Semester offered change, Catalog description change, Co-/Prerequisite change, Create new Course (s), Delete existing course.)

1. Describe the impact this change will have on students currently enrolled in the existing program.  
N/A
2. Provide advisory committee/industry input supporting this change.  
N/A
3. What is your plan to mitigate the impact this change will have on (1) similar secondary programs and (2) advanced learning opportunities?  
N/A

## COURSE SEQUENCE

AEROSPACE COMPOSITE REPAIR AND QUALITY ASSURANCE  
POSTSECONDARY TECHNICAL CERTIFICATE

SECOND SEMESTER (15 Weeks) AEROSPACE COMPOSITE REPAIR AND QUALITY ASSURANCE POSTSECONDARY TECHNICAL CERTIFICATE			
Course Prefix & Number	Course Title	Credits	Gen Ed/ Technical
AERO 140	Introduction to Quality Assurance	3	Tech
ENGL 099	Fundamentals for Writing	3	Gen Ed
AERO 131	Composite Repair	2	Tech
AERO 132	Complex Composite Repair	1	Tech
AERO 133	Electrical Bonding Repair	1	Tech
AERO 141	Geometric Dimensioning & Tolerance	1	Tech
AERO 142	Composite Inspection	1	Tech
<b>Total Credits</b>		<b>12</b>	

Summary (30 Weeks)	
General (Academic) Education	<b>3</b>
Technical Credits	<b>9</b>
Grand Total	<b>12</b>

## COURSE TITLES, DESCRIPTIONS AND CREDITS

List all technical course titles, descriptions, and credits for this program.

**AERO 140 Introduction to Quality Assurance.** This course is designed to provide general familiarization with aircraft systems and processes. Topics include introduction to aircraft systems, aerospace regulations, Electrostatic Discharge (ESD), conformity, and process improvement. This course is designed to provide entry-level quality control technicians with the hands-on experience they will need to inspect and document aircraft systems and processes. Topics include introduction to documentation procedures, and verification of aircraft systems.

**Credits: 3**

**Lecture:** 3 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program.

**ENGL 099 Fundamentals for Writing.** ENGL-099 provides writing instruction that focuses on fluency, development, organization, revision, and editing/proofreading. As a part of this course, students will practice reading actively and critically, engaging in dialogues with texts, drafting essays in a format appropriate to purpose and audience, and utilizing a process approach to writing. A grade of C- or above allows the student to enroll in ENGL-101.

**Credits: 3**

**Lecture:** 3 hours per week

**Prerequisite:** Entry is based on an appropriate score on the placement test of either between 31-67 on the COMPASS Writing, or between 15-17 on the ACT English, or between 380-440 on the SAT Verbal, **OR** a grade of C- or above in ENGL-045

**AERO 131 Composite Repair.** This course provides students with the knowledge and techniques used in structural repair of aircrafts made with composite materials. Students complete multiple industry-based projects designed to challenge their skills with both wet lay-up and prepreg and resin materials.

**Credits: 2**

**Lecture/Lab:** 4 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program and concurrently enrolled in or have completed AERO 120 with 2.0 grade or better.

**AERO 132 Complex Composite Repair.** This course provides students with hands-on experience working with nonstructural composite repairs. Instruction includes learning how to solve problems presented in non-production atmospheres in relation to composite repairs. Students also review case studies and problem-solving models.

**Credits: 1**

**Lecture/Lab:** 2 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program and concurrently enrolled in or have completed AERO 120 with 2.0 grade or better.

**AERO 133 Electrical Bonding Repair.** This course provides students with the knowledge and skills used in electrical bonding composite repair. Students learn theory and application using secondary bonding techniques.

**Credits: 1**

**Lecture/Lab:** 2 hours per week

**Prerequisite:** Must be enrolled in NIC Aerospace program and concurrently enrolled in or have completed AERO 120 with 2.0 grade or better.

**AERO 141 Geometric Dimensioning & Tolerance.** This course provides an understanding of the basic terms and principles of Geometric Dimensioning and Tolerancing (GD&T). The course provides students with the skills and knowledge necessary to identify GD&T symbols and how to interpret those symbols.

**Credits: 1**

**Lecture/Lab: 2 hours per week**

**Prerequisite:** Must be enrolled in NIC Aerospace program and concurrently enrolled in or have completed AERO 120 with 2.0 grade of better.

**AERO 142 Composite Inspection.** This course provides students with an understanding of the inspection process during repair procedures. Students learn the role of repair technicians in the inspection process while obtaining hands-on experience in basic Non-Destructive Testing techniques (NDT). Emphasis is placed on the importance of documentation and verification when inspecting repairs.

**Credits: 1**

**Lecture/Lab: 2 hours per week**

**Prerequisite:** Must be enrolled in NIC Aerospace program and concurrently enrolled in or have completed AERO 120 with 2.0 grade of better.

**APPENDIX A**  
**Program Completion Requirements**

<b>AEROSPACE COMPOSITE TECHNICIAN TECHNICAL CERTIFICATE</b>			
AERO	110	Safety/OSHA	1
AERO	111	Blueprint Reading	2
MATH	022	Technical Math	3
ENGL	099	Fundamentals of Writing	3
AERO	120	Introduction to Composites	3
AERO	140	Introduction to Quality Assurance	3
		<b>TOTAL LECTURE</b>	<b>15</b>
AERO	121	Composite Finish Trim	1
AERO	122	Composite Assembly	2
AERO	123	Composite Fabrication Methods/Applications	2
AERO	130	Disassembly & Damage Removal Techniques	1
AERO	131	Composite Repair	2
AERO	132	Complex Composite Repair	1
AERO	133	Electrical Bonding Repair	1
AERO	141	Geometric Dimensioning & Tolerance	1
AERO	142	Composite Inspection	1
		<b>TOTAL LAB</b>	<b>12</b>
		<b>TOTAL CREDIT</b>	<b>27</b>

## APPENDIX C

### NIC Survey Instrument

North Idaho College utilized Survey Monkey as the instrument used to conduct the industry needs assessment survey. The survey was required as part of the DOL grant application requirements and included collecting information related to industry information, employment forecasts, training gaps, skills need assessments, and other data needed to develop the actual proposal. The survey was sent to members of the Idaho Aerospace Alliance and other industry representatives who expressed interest and/or are existing industry partners of NIC.

The questions asked in the survey were:

- Company Name:
- Brief company description:
- Please identify the industry you represent:
- Describe the current demand for trained workers:
- What types of jobs are trained workers placed into?
- What industry recognized credentials are required for jobs at your business?
- What are the primary jobs you will be hiring for in the next 3-5 years?
- What are the minimum skills and qualifications needed for these jobs?
- What kind of training is currently available for these jobs?
- What kind of training is missing for these jobs?
- Where do you recruit your employees from?
- Who are the potential participants for training and employment, how do you recruit them?
- What do you anticipate the future demand for these workers?
- How many jobs will be available in the next year and in the next 5 years? Please Note: The grant proposal specifically requires this information, please make your best projection.
- What type of training do you anticipate needing in the next 3-5 years? (Technology trends, where is technology going and how will that affect the type of training you may need at your business.)
- Would you consider hiring graduates from North Idaho College?
- Would you consider mentoring or providing internship opportunities for NIC students?
- Would you be willing to serve on an advisory committee? This will allow continued collaboration with NIC and employers to provide support and direction for occupational and technical programs related to your industry?

## Results of NIC Survey

North Idaho College utilized Survey Monkey as the instrument used to conduct the industry needs assessment survey. The survey was required as part of the DOL grant application requirements and included collecting information related to industry information, employment forecasts, training gaps, skills need assessments, and other data needed to develop the actual proposal. The survey was sent to members of the Idaho Aerospace Alliance and other industry representatives who expressed interest and/or are existing industry partners of NIC. The questions asked in the survey can be found in **Appendix B**.

In addition to the calculated employment projections, surveys and interviews revealed additional employment opportunities with the local aerospace companies. NIC has identified the aerospace industry as having the best prospects for employment growth in the next two to five years.

The results of the survey questions are summarized and highlighted in the table below:

<b>North Idaho College survey of Local Aerospace Industry Employment Projections</b>				
<b>Company</b>	<b>Current employees 2012</b>	<b>Employee Estimates 2015</b>	<b>Net increase of employees</b>	<b>Entry level wage (hourly)*</b>
Empire Airlines, Hayden, ID	180	330	150	\$12 - \$17
LA Aluminum, Hayden, ID	30	90	60	\$16 - \$25
Unitech, Hayden, ID	110	210	100	\$11 - \$18
Quest Aviation, Sandpoint, ID	160	210	50	\$12.55
Cygnus, Inc., Sandpoint, ID	104	154	50	\$8.40 - \$28
Tamarack Aerospace Group, Sandpoint, ID	10	160	150	\$13 - \$23
Aerocet, Priest River, ID	34	84	50	\$10 - 20
<b>Totals</b>	<b>628</b>	<b>1238</b>	<b>610</b>	<b>\$22.65**</b>
*Jobs also include fringe benefits – medical, retirement, vacation, etc.				
** mean entry level wage				
Source: North Idaho College Community Outreach				

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**INSTRUCTION, RESEARCH AND STUDENT AFFAIRS**  
**JUNE 20, 2013**

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**SUBJECT**

Board Policy V.M. Intellectual Property – Second Reading

**REFERENCE**

October 2010	Board approved first reading of proposed amendments to Board Policy V.M.
December 2010	Board approved second reading of proposed amendments to Board Policy V.M. and requested the institutions bring forward their individual technology transfer policies to the Board for approval within 12 months.
June 2012	Board considered the institution's internal technology transfer policies and referred the issue to the IRSA Committee.
April 2013	Board approved first reading of proposed amendments to Board Policy V.M.

**APPLICABLE STATUTE, RULE, OR POLICY**

Idaho State Board of Education Governing Policies & Procedures, Section V.M.

**BACKGROUND/DISCUSSION**

At the April 2013 Board meeting the Board expressed concern that the policy covers all types of intellectual property as well as language regarding institution employee's assignment of ownership rights. Amendments made between the first and second reading are intended to address the concerns expressed by the Board. Additionally a new section was added to the Licensing Guidelines specific to the assignment of ownership of institution intellectual property.

**IMPACT**

The proposed changes to the policy include the incorporation of the licensing guidelines and will further clarify the Board's intent in regard to the transfer of technology developed at the institutions. Following approval of the second reading of Board policy V.M. the institutions will bring forward their internal policies for Board approval.

**ATTACHMENTS**

Attachment 1 – Board Policy V.M. – Second Reading.	Page 3
Attachment 2 – Institution Technology Licensing Guidelines	Page 8

**STAFF COMMENTS AND RECOMMENDATIONS**

The universities' general counsels and Vice Presidents of Research have worked collaboratively to bring forward the proposed amendments and licensing guidelines for Board consideration. Changes have been made to the policy between the first and second readings to incorporate comments made by Board members at the April 2013 Board meeting.

**INSTRUCTION, RESEARCH AND STUDENT AFFAIRS**  
**JUNE 20, 2013**

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Additional comments were received from Idaho State University expressing concern that the proposed amendments still do not adequately clarify that is acceptable to license intellectual property to companies that will not directly make, market and sell products and services, but instead facilitate the development and marketing of technology by further licensing. Due to the timing of receiving this agenda item there was adequate time to get consensus from the group on additional changes prior to finalizing the documents for the Board meeting. Staff from the institutions will be available to discuss whether or not there is a need to further clarify section 4.a.ii. as noted by Idaho State University.

The Board may also want to not that the guidelines, section 6, include language indicating that equity in a company be accepted in part as fair consideration to the institution for granting commercial licensing rights. This is not entirely consistent with the objectives listed in section 1 of the policy and may be in conflict with Article VIII, Section 2(1) of the State Constitution.

Staff recommends approval of the policy with deletion of the reference to obtaining equity in the Guidelines. Once the Board has established the direction they want to go in this and the involvement of the institutions in other business enterprises then additional amendments could be made to Board Policy V.M. to bring them into alignment.

**BOARD ACTION**

I move to approve the second reading of proposed amendments to Board Policy Section V.M. Intellectual Property and the Institution Technology Licensing Guidelines as presented.

Moved by \_\_\_\_\_ Seconded by \_\_\_\_\_ Carried Yes \_\_\_\_\_ No \_\_\_\_\_

**Idaho State Board of Education**  
**GOVERNING POLICIES AND PROCEDURES**

**SECTION: V. FINANCIAL AFFAIRS**

**Subsection: M. Intellectual Property**

~~December 2010~~June 2013

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1. Objectives and Purposes

The State Board of Education, on behalf of the state of Idaho, and the Board of Regents, on behalf of the University of Idaho, (hereinafter collectively referred to as the "Board") intellectual property, including patentable inventions and copyrightable works, may be the natural outgrowth of the educational, research, and outreach missions of Idaho's postsecondary education institutions. The Board is dedicated to promoting the beneficial use of such intellectual property for Idaho and the nation. This intellectual property policy seeks to balance the institutional obligations to preserve open access and inquiry with the concomitant obligation to foster and advance the dissemination and use of institutional intellectual property for the public benefit, which may occur through development of protectable discoveries and inventions through rigorous scientific investigation and research, and the development, acquisition, and licensing of patents and other intellectual property for the economic growth and development of Idaho and the nation.

In furtherance of this objective, institutions ~~shall in accordance with the Idaho Institution Licensing Guidelines, adopted by the Board June 2013, when~~ assigning, transferring, selling or licensing inventions, or patents or other intellectual property owned by the institutions, shall do so:

- a. to entities that make, market and sell products or services or that contractually agree to do so in connection with the licensed or transferred intellectual property;
- b. where the primary purpose of such assignment, transfer, sale or license directly aids and promotes the further development and commercialization of licensed products or services by such entity, and is not intended primarily for the purpose of further licensing or sublicensing such invention or patent to third parties for monetary gain only;
- c. where necessary for the institution to perform or have performed sponsored research or other institutional activities, including compliance with applicable requirements of law or contract associated with such research or other activity; or
- d. where the transferee is a non-profit entity engaged in research and education and the assignment, transfer, sale or license promotes further research and education for the public good and does not unduly impact use of the intellectual property to contribute to economic growth and development.

Any such transfer of institution intellectual property shall be made in accordance with the Idaho Institution Technology Licensing Guidelines, adopted by the Board June 2013.

**INSTRUCTION, RESEARCH AND STUDENT AFFAIRS**  
**JUNE 20, 2013**

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2. Intellectual Property

- a. Definition. Intellectual property includes, but is not limited to, any invention, discovery, creation, know-how, trade secret, technology, scientific or technological development, plant variety, research data, mark, design, mask work, work of authorship, and computer software regardless of whether subject to protection under patent, trademark, copyright or other laws.
- b. Claim of ownership interest. The Board, on behalf of the state of Idaho, through and by Idaho's postsecondary educational institutions under the governance of the Board (hereinafter referred to as "institutions") claims ownership of any intellectual property developed under any of the following circumstances:
  - i. Arising from any work performed by an employee of any institution during the course of their duties to the institution;
  - ii. Arising from any use by an employee of an institution or other person use of Board or institution resources not openly available to members of the general public including, but not limited to, laboratories, studios, equipment, production facilities, office space, personnel, or specialized computing resources; or
  - iii. Arising from any work performed by an employee of an institution under contract in a program or project sponsored by an institution or between institutions or a closely related research foundation.
- c. Disclaimer of ownership interest. The Board claims no ownership interest in any intellectual property developed by the employee(s) or other person(s), including but not limited to contractor(s) of an institution under the following circumstances:
  - i. When the work is performed outside the assigned duties of the employee/other person; and
  - ii. When the employee/other person is without benefit of Board or institution facilities except libraries.
- d. Policy review. Institutional policies setting out technology transfer administration, including evaluating, financing, assignment, marketing, protection, and the division and use of royalties, as well as amendments thereto, must be submitted to the Board for its review and approval.
- e. Condition of employment - Institution employees and contractors ~~must~~, as a condition of employment or contract, ~~agree and shall~~ adhere to this policy and the Board approved institutional policy on intellectual property shall assign to the institution all right, title, and interest in intellectual property to which the Board claims ownership under this policy or the institution claims ownership under its

**INSTRUCTION, RESEARCH AND STUDENT AFFAIRS**  
**JUNE 20, 2013**

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institutional policy and shall assign any related applications for legal protection of such intellectual property.

**3. Copyrights**

- a. Notwithstanding Section 2.c. of this Policy, when institution employees/other persons are specially ordered or commissioned to produce specific work, the institution reserves the right to seek and obtain registration of copyright for such works in the name of the state of Idaho or the institution or to use such work without securing a copyright registration.
- b. Except as noted in Section 3.a. above, neither the Board nor any institution is required to claim an ownership interest in works submitted for publication, performance or display by institution employees/other persons. Instead, institutions subject to this policy may elect, by contract or institutional policy, to claim an interest in copyrightable material produced, in whole or part, by their employees or other persons subject to this policy. Institutional policy shall provide for institutional ownership in circumstances including, but not limited to, the following:
  - i. In cases of specific contracts providing for institutional ownership,
  - ii. In cases where the constituent institution or sponsor may employ personnel for the purpose of producing a specific work,
  - iii. Where institutional ownership is deemed necessary in order to reflect the contribution of the institution to the work, or
  - iv. Where a sponsored agreement requires institutional ownership.

**4. Intellectual Property Transfer**

- a. The Board delegates to the institutions the right to transfer, convey, license, or disclaim, in accordance with the Institution Technology Licensing Guidelines, rights in intellectual properties developed within each respective institution. This policy allows the institutions to effect knowledge transfer and foster economic growth and development. Under this policy, each respective institution may:
  - i. Grant any or all intellectual property rights to affiliated research foundations for further development or transfer.
  - ii. Sell, assign, transfer, or exclusively or non-exclusively license intellectual property rights owned by the institution to for-profit, non-profit, and/or governmental entities that make, market and sell products or services or that contractually agree to do so in connection with the transferred or licensed intellectual property, or where the primary purpose of such assignment, transfer, sale or license directly aids and promotes the further development of

**INSTRUCTION, RESEARCH AND STUDENT AFFAIRS**  
**JUNE 20, 2013**

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the intellectual property or commercialization of products or services or the underlying intellectual property by such entity. However, such assignment, transfer, sale or license to third parties must not be for ~~the sole or primary purpose of bringing an infringement action~~ monetary gain only.

- iii. Sell assign, transfer, or exclusively or non-exclusively license to institution employees or other persons subject to this policy.
  - iv. Collect and disburse license payments in accordance with institutional policy to inventors and their departments and colleges, as well as to their institutions.
  - v. Permit institutional employees the right to participate in ownership and governance of for-profit, non-profit, and/or governmental entities that licensed institutional intellectual property to produce and market products and technology based on or derived from the licensed the intellectual property, subject to the conflict of interest policies set forth in Idaho State Board of Education Governing Policies and Procedures, Section I.G. and II.Q.
- b. Each institution shall develop an institutional policy on technology transfer. At a minimum, an institution's policy shall include:
- i. The name of the institutional position (or office) with the authority and responsibility for carrying out the policy and binding the institution contractually.
  - ii. Policy and plans for patent acquisition (i.e., who initiates, who pays the lawyers, and an enumeration of the duties, responsibilities, and a process for settling debates).
  - iii. The range of allowable institutional involvement in the transfer process (i.e., from licensing to acceptance of institutional ownership interests, continued development in institutional facilities for the benefit of the licensee, business planning or production assistance).
  - iv. The requirement that institution employees and other persons subject to this Board policy make a present assignment to the institution of rights, including future rights, in intellectual property to which the Board claims ownership by this policy and/or the institution claims ownership by its institutional policy and in any related applications for legal protection of such intellectual property.
- c. At the request of the Board the appropriate officer of each institution shall report on technology transfer activities that have occurred at the institution and the general effectiveness of the institution in deploying technology. Institutions should report performance data through the annual Association of University Technology Licensing survey. The report shall also indicate whether any employees of the institution or its respective research foundation have a financial

**INSTRUCTION, RESEARCH AND STUDENT AFFAIRS**  
**JUNE 20, 2013**

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interest in the entity to which the intellectual property rights were conveyed. Terms of any license or technology transfer contract will be made available in confidence upon request for inspection by the Board.

**Idaho State Board of Education**  
**Institution Technology Licensing Guidelines**

Adopted June 2013

The Idaho State Board of Education (Board) recognizes that institutions must share intellectual property with the public for the betterment of society. To provide a set of operating guidelines for such technology transfer, the Board has adopted these guidelines, derived from the “Nine Points” publication produced by the Association of Institution Technology Managers (AUTM) and the “University Licensing Guidelines” adopted by the Regents of the University of California.

The College and Universities under the Board’s governance (hereinafter collectively “institutions” or “institution”) share certain core values that can and should be maintained to the fullest extent possible in all technology transfer agreements. The purpose of licensing institution intellectual property (IP) rights and materials is to: encourage the practical application of the results of institution research by industry for the broad public benefit; meet our obligations to sponsors of institution research; build research relationships with industry partners to enhance the research and educational experience of researchers and students; stimulate commercial uptake and investment; stimulate economic development; and ensure an appropriate return of taxpayer investments in institution research. Financial returns from technology licensing provide additional support for research and education, an incentive for faculty retention, and support of the institution technology transfer program. Institutions are charged to pursue these objectives in licensing institution IP. In carrying out these objectives, institutions are called upon to make complex licensing decisions based upon a multiplicity of facts and circumstances and by applying their professional experience, in consideration of the following guidelines. It is incumbent of the institutions to analyze each licensing opportunity individually in a manner that reflects the business needs and values of their institution, but at the same time, to the extent appropriate, also to bear in mind the concepts articulated herein when crafting agreements with industry. Multiple factors must be considered in each transaction, such as: the nature and stage of development of the technology; the breadth and complexity of the potential fields of use; the product development path and timeline; the extent of intellectual property protection; the relevant markets and market niches; specific campus practices; unique needs of prospective licensees; ethical considerations for the use of future products; and emerging issues, among other elements. All factors require careful consideration in developing a relationship with a prospective licensee, and the institution needs flexibility to address each of these issues. Further, the result of any one licensing decision may or may not be appropriate to another similar situation, as changes in knowledge and individual factors should be taken into consideration for each case-specific circumstance.

In all cases, the institution reserves the right, to the fullest extent permitted by Board policy and law, to exercise its discretion over decisions regarding its choice of licensee, the extent of rights licensed, and/or a refusal to license to any party.

## **GUIDELINES**

*1. The primary objective in developing a patenting and licensing strategy for an invention should be to support the education, research, and public benefit mission of the institution.*

The institution recognizes the need for and desirability of broad utilization of the results of institution research, not only by scholars but also for the general public benefit, and acknowledges the importance of the patent system in providing incentives to create practical applications that achieve this latter goal.

In addition, with respect to federally-funded inventions (which comprise a large portion of the institution's invention portfolio), the Bayh-Dole Act (35 U.S.C. 200-212) requires the institution's use of the patent system to promote the utilization of inventions arising from federally supported research, to encourage maximum participation of small business firms, to promote collaboration between commercial concerns, nonprofits and universities and to promote free enterprise without unduly encumbering future research and discovery. As such, the institution is responsible for crafting a technology management strategy that supports the education, research, and public service mission of the institution. This requires establishing a balance of priorities between the timely transfer of technology to industry for commercialization while preserving open access to research results for use by the institution and the research community.

A primary licensing decision is whether to license exclusively or non-exclusively. The institution should consider licensing either non-exclusively, or exclusively within specific fields-of- use when an invention is broad in scope and can be used in multiple industries as well as for a platform technology that could form the basis of new industries. In general, institutions should consider granting exclusive licenses to inventions that require significant investment to reach the market or are so embryonic that exclusivity is necessary to induce the investment needed to develop and commercialize the invention or when the technology requires a company willing to dedicate financial resources and the additional research to realize the commercial potential. Finally, as noted below, exclusive licensing must have performance milestones connected to the continuation of such exclusivity.

Alternatively, an exclusive "field-of-use" license is a way to create market incentives for one company while enabling the institution to identify additional licensees to commercialize the invention in additional markets. In some cases, a limited-term exclusive license that converts to a non-exclusive license can be an effective strategy to meet the public benefit objective. Further, special consideration should be given to the impact of an exclusive license on uses of a technology that may not be appreciated at the time of initial licensing. A license grant that encompasses all fields of use for the life of the licensed patent(s) may have negative consequences if the subject technology is found to have unanticipated utility. This possibility is particularly troublesome if the licensee is not able or willing to develop the technology in fields outside of its core business. Institutions are encouraged to use approaches that balance a licensee's legitimate commercial needs against the university's goal (based on its educational mission and the public interest) of ensuring broad practical application of the fruits of its research programs.

Finally, the licensing strategy should ensure prompt broad access to unique research resources developed by the institution. To preserve the ability of the institutions to perform research, ensuring that researchers are able to publish the results of their research in dissertations and peer-reviewed journals and that other scholars are able to verify published results without concern for patents, the institution should consider reserving rights in all fields of use, even if the invention is licensed exclusively to a commercial entity, for themselves and other non-profit and governmental organizations. This is designed to practice inventions and to use associated information and data for research and educational purposes, including research sponsored by commercial entities and to transfer research materials and results to others in the non-profit and governmental sectors. Clear articulation of the scope of reserved rights is critical.

*2. Institution must meet existing third party obligations*

Research projects increasingly involve a multiplicity of third party agreements and relationships. For some inventions, the institution will have existing licensing obligations to a company or other research partner based upon contractual commitments made under sponsored research, material transfer, database access, inter-institutional, or other third-party IP agreements. Institutions shall seek to identify all licensing obligations to third parties so that such obligations can be met. While the inventor(s) should be required to identify these obligations at the time of disclosure to the institution, the institution is encouraged to verify the completeness or accuracy of the inventor(s) obligations.

Direct discussions with the inventor(s) and/or review of system-wide and local contract and grant databases may help determine whether the appropriate agreements are identified. Careful review of these agreements is critical to understanding the nuances of any third party obligations. Copies of any relevant agreements should be retained in the licensing file for future reference and to document the basis for decisions affecting the status of such third party obligations.

In addition, the institution should evaluate any other factors that may affect the institution's right to license the invention. The institution should investigate whether an inventor's disclosed invention entails a possible claim to prior ownership rights by a third party based upon the inventor's previous or current outside activities, for example, consulting arrangements, visiting scientist agreements, inventor start-up companies, and other contract obligations, particularly in light of court decisions (e.g. *Stanford v. Roche*, Fed Cir., 2009).

*3. The selected licensee should be capable of bringing the invention to the marketplace and the license should be structured in a manner that encourages technology development and use.*

The institution should seek licensees capable of bringing the invention to the marketplace in a timely manner. While often only one potential licensee comes forward for any given institution invention, the institution should nevertheless assess the potential licensee's technical, managerial and financial capability to commercialize the technology. From a programmatic perspective, licensing preference should be given to small business concerns, when appropriate, pursuant to federal law and regulations, provided such small businesses appear capable of bringing the technology to the marketplace.

Institutions should use care when licensing multiple technologies, invention portfolios, or a single technology with multiple variant applications to a single commercial organization to ensure that the licensing strategy meets the institution's desire to maximize public benefit.

In selecting a licensee, the institution, should consider whether the potential licensee:

- has a general business plan that delineates a clear strategy to commercialize the invention
- has or can secure the technical, financial and personnel resources to develop and commercialize the invention in a timely manner
- has experience relevant to developing and commercializing the invention
- has appropriate marketing capabilities
- possesses a strong desire and commitment to make the product/technology a success
- is able to meet any regulatory requirements needed to commercialize the technology
- has, or can develop sufficient capacity to satisfy the market demand for the technology
- demonstrates commitment to the institution's invention in light of other technologies competing for resources in the company
- has goals that generally align with those of the institution with respect to public benefit

The institution should obtain and retain documents that address the licensee's ability to bring the technology to the market. In the case of a start-up company, not all factors necessary to commercialize the technology may be present at the outset. The institution should consider whether the start-up has an appropriate level of resources and technical capabilities, given the development stage of the company and the nature of the invention, as well as whether the start-up has the potential to acquire the necessary resources to successfully develop and market the technology in a timely manner.

Institutions also need to be mindful of the impact of granting overly broad exclusive rights and should strive to grant just those rights necessary to encourage development of the technology. Performance milestones are a necessary part of any license, and are even more important in exclusive licenses.

In situations where an exclusive license is warranted, it is important that licensees commit to diligently develop the technology to protect against a licensee that is unable or unwilling to move an innovation forward. In long-term exclusive licenses, diligent development should be well-defined and regularly monitored during the exclusive term of the agreement and should promote the development and broad dissemination of the licensed technology. Ideally, objective, time-limited performance milestones are set, with termination or non-exclusivity (subject to limited, but reasonable, cure provisions) as the penalty for breach of the diligence obligation.

Another means of ensuring diligent development, often used in conjunction with milestones, is to require exclusive licensees to grant sublicenses to third parties to address unmet market or public health needs ("mandatory sublicensing") and/or to diligently commercialize new applications of the licensed rights. Such a requirement could also be implemented through a reserved right of the licensor to grant direct licenses within the scope of the exclusive grant to third parties based on unmet need. In such situations, it is important to ensure that the parties have a common

understanding of what constitutes a new application or unmet need for the purpose of implementing such a provision.

### *3.A. Future Improvements*

Although licensees often seek guaranteed access to future improvements on licensed inventions, the obligation of such future inventions may effectively enslave a faculty member's research program to the company, thereby exerting a chilling effect on their ability to receive corporate and other research funding and to engage in productive collaborations with scientists employed by companies other than the licensee – perhaps even to collaborate with other academic scientists. In particular, if such future rights reach to inventions made elsewhere in the university, researchers who did not benefit from the licensing of the original invention may have their opportunities restricted as well, and may be disadvantaged economically relative to the original inventors if the licensing office has pre-committed their inventions to a licensee.

For these reasons, exclusive licensees should not automatically receive rights to “improvement” or “follow-on” inventions. Instead, as a matter of course, licensed rights should be limited to existing patent applications and patents, and only to those claims in any continuing patent applications that are (i) fully supported by information in an identified, existing patent application or patent and (ii) entitled to the priority date of that application or patent.

In the rare case where a licensee is granted rights to improvement patents, it is critical to limit the scope of the grant so that it does not impact uninvolved researchers and does not extend indefinitely into the future. It is important to further restrict the grant of improvements to inventions that are owned and controlled by the licensor institution - i.e., (i) not made by the inventor at another institution, should they move on or (ii) co- owned with, or controlled by, another party. One refinement to this strategy would be to limit the license to inventions that are dominated by the original licensed patents, as these could not be meaningfully licensed to a third party, at least within the first licensee's exclusive field. As was discussed earlier, appropriate field restrictions enable the licensing not only of the background technology, but also of improvements, to third parties for use outside the initial licensee's core business. In all cases, a license to improvements should be subject to appropriate diligent development requirements.

It should be recognized, however, that not all “improvements” have commercial potential (for example, they may not confer sufficient additional benefit over the existing technology to merit the expense of the development of new or modified products), in which case a licensee might not wish to develop them. In general, it may be best simply not to patent such improvements.

#### *4. The license agreement should include diligence terms that support the timely development, marketing, and deployment of the invention.*

The institution should include diligence provisions in a license agreement to ensure that the licensee develops and commercializes the invention in a timely manner, especially when an invention is exclusively licensed. The institution's commitment to public benefit is not met by allowing an invention to languish due to a licensee's lack of commitment, “shelving” the technology to protect its competing product lines, or inadequate technical or financial resources.

**INSTRUCTION, RESEARCH AND STUDENT AFFAIRS**  
**JUNE 20, 2013**

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Appropriate diligence provisions are invention-specific and will vary depending on the circumstances. Common diligence obligations that an institution should consider include:

- the amount of capital to be raised (for a start-up) or the amount of funding committed (for an existing business) by the company to support the technology's development.
- specific dates by which the licensee must achieve defined milestones, such as: secure levels of regulatory approval; make a working prototype; initiate beta testing of a licensed product; receive formal market/customer feedback; achieve specific prototype performance thresholds (such as efficiency or size); establish a production facility; first sell the commercial product; or achieve a certain level of sales.

To ensure that the institution continues to manage its technologies as assets for the public's benefit, clearly defined diligence provisions allow verification of the licensee's compliance with its diligence obligations. Therefore, the licensing agreement language should be sufficiently specific so that both parties can determine whether the diligence obligations have been met. Further, the license should provide a remedy for failure to meet diligence obligations, such as termination of the license or, in the case of an exclusive license, a reduction to a non-exclusive license.

*5. The license agreement should be approved as to legal integrity and consistency.*

In order to ensure that the institution has the right to enter into licensing discussion, the institution should ensure that the inventors have signed an agreement that acknowledges the institution's patent policy, and institution claim of ownership of inventions under the Policy, and/or an actual Assignment Agreement that confirms the institution's ownership in the invention and that includes a present assignment of invention rights.

In determining the rights that can be granted in a license agreement, the institution should ask the inventors about past and present sponsors of their research, material providers, and independent consulting and other agreements (e.g., visitor, confidentiality, etc.) they have signed that could be related to the invention to determine if conflicting obligations exist between such agreements and the proposed license.

The institution shall ensure that the provisions of the license agreement are reviewed and approved by the institution Office of General Counsel, and comply with institution policies with regard to legal integrity and consistency, including the following concerns:

*5.A. Use of Name:*

The institution shall ensure that the license agreement prohibits the use of the institution's name, or the names of its employees, to promote the licensee or its products made under the license agreement, unless specifically approved by authorized institution personnel. The license may provide limited use of the institution's name where required by law, to give effective legal notice such as a copyright mark, or to make a statement of fact regarding the origin of plant material.

*5.B. Indemnification:*

The institution shall ensure that the license agreement contains an indemnification provision under which the licensee assumes all responsibility for any product or other liability arising from the exercise of the license covering the invention. The licensee should assume all responsibility as it has complete control over product development while the institution only provides rights under the patents it holds.

*5.C. Limitation of Liability:*

The institution shall ensure that the license agreement contains a provision that limits the institution's liability for any damages that may result from the licensee's acts under the license agreement (e.g., intellectual property infringement, lost profits, lost business, cost of securing substitute goods, etc.).

*5.D. Insurance:*

The institution shall ensure that the license agreement requires the licensee to carry sufficient insurance or have an appropriate program of self-insurance to meet its obligations to protect the institution, and provide evidence of such.

*5.E. Limited Warranty:*

The institution shall ensure that the license agreement contains a limited warranty provision stating that nothing in the license shall be construed as (i) a warranty or representation regarding validity, enforceability, or scope of the licensed patent rights; (ii) a warranty or representation that any exploitation of the licensed patent rights will be free from infringement of patents, copyrights, or other rights of third parties; (iii) an obligation for the institution to bring or prosecute actions or suits against third parties for patent infringement except as provided in the infringement provision of the license; (iv) conferring by implication, estoppel, or otherwise any license or rights under any patents or other rights of institution other than the licensed patent rights, regardless of whether such patents are dominant or subordinate to the licensed patent rights; and (v) an obligation to furnish any new developments, know-how, technology, or technological information not provided in the licensed patent rights.

*5.F. Patent Prosecution:*

The institution shall ensure that the license agreement contains a patent prosecution provision that stipulates the institution will diligently prosecute and maintain the patent rights using counsel of its choice who will take instructions solely from the institution. The institution will use reasonable efforts to amend any patent application to include claims requested by the Licensee. For an exclusive license, all such costs will be borne by the licensee. For non-exclusive licenses, a common practice is for each licensee to pay a pro-rata share of such costs.

*5.G. Patent Infringement:*

The institution shall ensure that an exclusive license agreement contains a patent infringement provision that stipulates that neither the institution nor the licensee will notify a third party (including the infringer) of infringement or put such third party on notice of the existence of any patent rights without first obtaining consent of the other party; with additional language that addresses infringement notification process, participation, control and prosecution of the suit, and payment of costs and sharing of awarded damages.

*5.G.1. Infringement Action Considerations*

In considering enforcement of their intellectual property, it is important that universities be mindful of their primary mission to use patents to promote technology development for the benefit of society. All efforts should be made to reach a resolution that benefits both sides and promotes the continuing expansion and adoption of new technologies. Litigation is seldom the preferred option for resolving disputes.

However, after serious consideration, if a university still decides to initiate an infringement lawsuit, it should be with a clear, mission-oriented rationale for doing so- one that can be clearly articulated both to its internal constituencies and to the public. Ideally, the university's decision to litigate is based on factors that closely track the reasons for which universities obtain and license patents in the first place, as set out elsewhere in this paper. Examples might include:

- Contractual or ethical obligation to protect the rights of existing licensees to enjoy the benefits conferred by their licenses; and
- Blatant disregard on the part of the infringer for the university's legitimate rights in availing itself of patent protection, as evidenced by refusal on the part of the infringer to negotiate with or otherwise entertain a reasonable offer of license terms.

*5.G.2. Patent Aggregators and "Flippers"*

As is true of patents generally, the majority of university-owned patents are unlicensed. With increasing frequency, university technology transfer offices are approached by parties who wish to acquire rights in such 'overstock' in order to commercialize it through further licenses. These patent aggregators typically work under one of two models: the 'added value' model and the so-called 'patent troll' model.

Under the added value model, the primary licensee assembles a portfolio of patents related to a particular technology. In doing so, they are able to offer secondary licensees a complete package that affords them freedom to operate under patents perhaps obtained from multiple sources. As universities do not normally have the resources to identify and in-license relevant patents of importance, they cannot offer others all of the rights that may control practice (and, consequently, commercialization) of university inventions. By consolidating rights in patents that cover foundational technologies and later improvements, patent aggregators serve an important translational function in the successful development of new technologies and so exert a positive force toward commercialization. For example, aggregation of patents by venture capital

groups regularly results in the establishment of corporate entities that focus on the development of new technologies, including those that arise from university research programs. To ensure that the potential benefits of patent aggregation actually are realized, however, license agreements, both primary and secondary, should contain terms (for example, time-limited diligence requirements) that are consistent with the university's overarching goal of delivering useful products to the public.

In contrast to patent aggregators who add value through technology-appropriate bundling of intellectual property rights, there are also aggregators (the 'patent trolls') who acquire rights that cut broadly across one or more technological fields with no real intention of commercializing the technologies. In the extreme case, this kind of aggregator approaches companies with a large bundle of patent rights with the expectation that they license the entire package on the theory that any company that operates in the relevant field(s) must be infringing at least one of the hundreds, or even thousands, of included patents. Daunted by the prospect of committing the human and financial resources needed to perform due diligence sufficient to establish their freedom to operate under each of the bundled patents, many companies in this situation will conclude that they must pay for a license that they may not need. Unlike the original patent owner, who has created the technology and so is reasonably entitled to some economic benefit in recognition for its innovative contribution, the commercial licensee who advances the technology prior to sublicensing, or the added value aggregator who helps overcome legal barriers to product development, the kind of aggregator described in this paragraph typically extracts payments in the absence of any enhancement to the licensed technology. Without delving more deeply into the very real issues of patent misuse and bad-faith dealing by such aggregators, suffice it to say that universities would better serve the public interest by ensuring appropriate use of their technology by requiring their licenses to operate under a business model that encourages commercialization and does not rely primarily on threats of infringement litigation to generate revenue.

A somewhat related issue is that of technology 'flipping', wherein a non-aggregator licensee of a university patent engages in sublicensing without having first advanced the technology, thereby increasing product development costs, potentially jeopardizing eventual product release and availability. This problem can be addressed most effectively by building positive incentives into the license agreement for the licensee to advance the licensed technology itself – e.g., design instrumentation, perform hit-to-lead optimization, file an IND. Such an incentive might be to decrease the percentage of sublicense revenues due to the university as the licensee meets specific milestones.

#### *5.H. Third Party Obligations and Conflicts of Interest:*

Technology transfer offices should be particularly conscious and sensitive about their roles in the identification, review and management of conflicts of interest, both at the investigator and institutional levels. Licensing to a start-up founded by faculty, student or other university inventors raises the potential for conflicts of interest; these conflicts should be properly reviewed and managed by academic and administrative officers and committees outside of the technology transfer office. A technology licensing professional ideally works in an open and collegial manner with those directly responsible for oversight of conflicts of interest so as to ensure that

potential conflicts arising from licensing arrangements are reviewed and managed in a way that reflects well on their university and its community. Ideally, the university has an administrative channel and reporting point whereby potential conflicts can be non-punitively reported and discussed, and through which consistent decisions are made in a timely manner.

#### *5.I. Export Controls*

Institution technology transfer offices should have a heightened sensitivity about export laws and regulations and how these bodies of law could affect university licensing practices. Licensing “proprietary information” or “confidential information” can affect the “fundamental research exclusion” (enunciated by the various export regulations) enjoyed by most university research, so the use of appropriate language is particularly important. Diligence in ensuring that technology license transactions comply with federal export control laws helps to safeguard the continued ability of technology transfer offices to serve the public interest.

#### *6. The institution should receive fair consideration in exchange for the grant of commercial licensing rights.*

The institution should ensure that institution receives fair consideration for commercial licenses of its inventions (as public assets created using public funds, supplies, equipment, facilities, and/or staff time) to private entities. Generally, the value of the consideration received by the institution should be based on the licensee’s sale or distribution of licensed products or licensed services by the licensee. Other factors that impact the negotiation of the institution’s consideration may include:

- the type of technology and industry
- the stage of development and market consideration
- the perceived value to the licensee’s business and competitive position (“must-have” vs. “nice-to-have”)
- the market potential, contribution of the technology to market penetration, and market sector dynamics (i.e. growing, static, declining?)
- the projected cost and risk of product development and marketing
- the competitive advantage over alternative products; is the invention a seminal “game-change” one or an incremental improvement?
- the likelihood of competing technologies
- the net profit margin of the anticipated product
- comparable prices for similar technologies or products
- the scope and enforceability of the institution’s patent claims, extent of freedom-to- operate required, and years remaining on patent term
- the projected decrease in the cost of production or R&D expenditures
- the scope of license (exclusive/nonexclusive, narrow/broad fields of use, U.S./non- U.S.)
- the opportunity for accelerated time to market based upon the necessity for meeting a critical public need.

**INSTRUCTION, RESEARCH AND STUDENT AFFAIRS**  
**JUNE 20, 2013**

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In general, the fair consideration to the institution should be in cash, but other forms of consideration may be accepted in partial lieu of cash fee(s) such as equity in the company (discussed below). The form of such consideration negotiated by the institution may vary widely based on case-specific factors.

The institution should consider including some or all of the following elements as part of the consideration:

*6.A. Reimbursement of institution's patent costs:*

The licensee pays for domestic and/or foreign patent applications either through an up-front fee that covers past and future costs and/or through a requirement to reimburse past, present and future costs upon invoicing by the institution. Where the technology is licensed to multiple parties, reimbursement may be done on a pro-rata basis. Full reimbursement by an exclusive licensee is standard institution practice.

*6.B. License Issue fee:*

The licensee pays a fee to the institution upon final execution of the license agreement either in a lump sum or on an agreed upon schedule. The amount of this fee should reflect the value of the invention at the time it is made available to the licensee. Such fees range widely, depending on the circumstance. Under some circumstances, the issue fee for small companies or start-ups may be partially postponed until sufficient investment capital is secured, or may be replaced in part by the institution's acceptance of equity in the company (see *Equity* below).

*6.C. Running royalties:*

The licensee pays ongoing consideration to the institution in the form of a running (or earned) royalty, typically calculated as a percentage of net sales or use of licensed products or services that incorporate the technology. Such royalties should not be "capped" at a pre-determined dollar level, as the institution should share fully in the success of any commercial use of technology made available to the licensee. In some rare cases, a running royalty value may be difficult to assess due to the particular market and the type of products being developed. In such cases a fixed amount for each unit of licensed product sold or a one-time or annual fee may be contemplated, where the fee should reflect the value of the invention over the projected length of patent protection (both U.S. and foreign).

*6.D. Annual maintenance fee/minimum annual royalty:*

The licensee pays an annual license maintenance fee which serves as a form of diligence and represents the licensee's continuing interest in and a financial commitment to commercialize the invention. A minimum annual royalty begins in the first year of commercial sales and serves not only as a diligence obligation but also incentivizes the licensee to achieve sales generating royalties that meet or exceed the minimum annual royalty. Typically, annual maintenance fees cease after commercial sales begin when they are replaced by the minimum annual royalty. Minimum annual royalties, if paid in advance, are generally creditable against the running

royalty due that year. The institution may use these fees singly, in combination, or not at all as judgment dictates, however, including such fees not only creates diligence obligations but also provides annual income to support the institution's research and education mission.

*6.E. Sublicensing fees:*

Under an exclusive license where the licensee is permitted to transfer rights to third parties (a sublicense), the licensee pays the institution consideration for sales or use of licensed products or services by its sublicensees. The institution should receive a fair share of all consideration, including royalty and non-royalty income, received by the licensee from the sublicensee. It is institution practice not to include sublicensing rights under its non-exclusive licenses as the granting of such rights could place the licensee in direct licensing competition with the institution, except in those cases where the sublicensee's activities are necessary for the sublicensor to commercialize the licensed technology (e.g. sublicensee is a contract research organization or contract manufacturer providing a vital component to the sublicensor necessary for the licensed technology, etc.).

*6.F. Equity:*

To encourage commercialization of institution technology, the institution may accept equity in a company as partial consideration for invention licensing in a manner consistent with Board and institution policies. This option may be particularly useful in working with small or startup companies where financial considerations limit the company's and its investors' willingness to pay cash to the university for licensing costs, such as license issue fees and annual maintenance fees. When accepting equity, institutions should consider the risk-adjusted value of equity and the potential loss of value associated with dilution of equity.

*6.G. Other:*

The institution may negotiate forms of consideration other than those described above, such as milestone payments upon the completion of certain licensed product development events or upon financing or investment triggers (e.g., investment rounds, merger or acquisition, or a public stock offering). Other unique exchanges of value occasionally may be appropriate forms of fair consideration. The institution should note, however, that such non-monetary forms of consideration (other than equity) fall outside the royalty-sharing provisions of the institution Patent Policy. The institution should take care to not designate research funding as a form of consideration in a license as license income is subject to the royalty-sharing provisions of the institution Patent Policy whereas research funding is not consideration for a license but is fixed at a level to pay for the cost of conducting the research (*Singer v. The Regents*, 1996).

Finally, the institution should be aware that "overly-aggressive" negotiation of financial consideration may impede commercialization of an invention and may not be consistent with certain research sponsor guidelines (e.g., Federal, State, or non-profit extramural sponsorship policies). However, undervaluing a commercial license reduces the additional monetary support for research and education and compromises the principle of seeking a fair return on the public asset that is the institution's technology. The institution should weigh all appropriate

factors discussed above in crafting a commercial license to create an optimal structure and fair consideration.

*7. The license agreement should support the academic principles of the institution.*

The institution should ensure that the provisions of the license agreement support the institution's academic teaching and research mission, including the following concerns:

*7.A. Open Dissemination of Research Results and Information:*

License agreements with external parties shall not limit the ability of institution researchers to disseminate their research methods and results in a timely manner. The most fundamental tenet of the institution is the freedom to interpret and publish, or otherwise disseminate, research results to support knowledge transfer and maintain an open academic environment that fosters intellectual creativity.

*7.B. Accessibility for Research Purposes:*

The institution should ensure that the license agreement protects the ability of institution researchers, including their student and research collaborators, to use their inventions in future research, thus protecting the viability of the institution's research programs. The institution has a commitment to make the results of its research widely available through publication and open distribution of research products for verification and ongoing research. The institution also seeks to foster open inquiry beyond the interests of any one research partner, particularly where the invention is a unique research tool. One way in which the institution addresses this is through the retention in the license agreement of the institution's right to use and distribute inventions to other non-profit research institutions for research and educational purposes.

*7.C. Broad Access to Research Tools:*

Consistent with the NIH Guidelines on Research Tools, principles set forth by various charitable foundations that sponsor academic research programs and by the mission of the typical university to advance scientific research, universities are expected to make research tools as broadly available as possible. Such an approach is in keeping with the policies of numerous peer-reviewed scientific journals, on which the scientific enterprise depends as much as it does on the receipt of funding: in order to publish research results, scientists must agree to make unique resources (e.g., novel antibodies, cell lines, animal models, chemical compounds) available to others for verification of their published data and conclusions.

Through a blend of field-exclusive and non-exclusive licenses, research tools may be licensed appropriately, depending on the resources needed to develop each particular invention, the licensee's needs and the public good. The drafting of such an exclusive grant should make clear that the license is exclusive for the sale, but not use, of such products and services; in doing so, the university ensures that it is free to license non-exclusively to others the right to use the

**INSTRUCTION, RESEARCH AND STUDENT AFFAIRS**  
**JUNE 20, 2013**

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patented technology, which they may do either using products purchased from the exclusive licensee or those that they make in-house for their own use.

8. *All decisions made about licensing institution inventions should be based upon legitimate institutional academic and business considerations and not upon matters related to personal financial gain.*

It is important that the institution conduct the technology transfer process, including patenting, marketing, and licensing in a manner that supports the education, research, and public service missions of the institution over individual financial gain.

Because institutions and inventors may have the opportunity to influence institution business decisions in ways that could lead to personal gain or give advantage to associates or companies in which they have a financial interest, the institution and the inventor must comply with existing Board policy, institution policy and State law concerning such potential conflicts of interest. Under Board policy and State conflict of interest law, any institution employee or representative is prohibited from making, participating in making, or influencing an institution decision (including selection of licensees and other decisions made in the course of commercializing institution technology) in which they have a personal financial interest. Certain specific actions may be taken, however, consistent with Board policy, institution policy and State law, to allow participation in the licensing process by such inventors. An inventor's expectancy of receiving money or equity as inventor share under the institution Patent Policy is not a disqualifying financial interest.

For institutions who have a personal financial interest in potential licensees, this situation can be readily managed by having the invention case assigned for management to another institution without a financial interest. For inventors who have a personal financial interest in potential licensees, another individual with appropriate scientific and technical background may be able to carry out the duties and responsibilities typically handled by the inventor. In both cases, personal disqualification requirements would need to be satisfied under Board policy, institution policy and State law.

Institution inventors, however, may not be able to reasonably remove themselves from involvement in the process under disqualification requirements as their expertise and input may be essential to successful technology transfer. It may be necessary for the inventor to work closely with the institution and with potential licensees, or involve themselves in companies that are potential licensees, with the objective of commercializing institution inventions, even when they have a personal financial interest. It is in this context, when the inventor is involved in the process, that the selection of a licensee and other commercialization decisions may have the potential to raise concerns about conflicts of interest. Some inventor contributions to the licensing process are primarily technical advice and do not constitute "participation in" or "attempting to influence" a licensing decision under State conflict of interest law. They are called "ministerial." An action is ministerial, even if it requires considerable expertise and professional skill, if there is no discretion with respect to the outcome. Thus an inventor can provide technical or scientific information about an invention where necessary without being

considered to be participating in a licensing decision. This exception, however, does not apply to technical tasks such as most data gathering or analysis in which the inventor makes professional judgments which can affect the ultimate decision in question.

Therefore, the institution and inventor(s) should discuss: i) the disqualification option; ii) an approach to and level of inventor involvement in the technology transfer process; iii) compliance with Board policy, institution policy and State law concerning potential conflicts of interest; and (iv) where helpful, these institution Licensing Guidelines.

In general, the role in the technology transfer process of any inventor who has a personal financial interest in a potential licensee should be kept to the minimum necessary to successfully achieve the institution's objectives in patenting, marketing, and licensing. When an inventor has a personal financial interest in a potential licensee and does not fully disqualify him or herself from involvement in the process, an independent substantive review (Licensing Decision Review - LDR) and recommendation concerning the licensee selection and other licensing decisions is required. Thus, both the institution and the inventor should understand that the extent to which the inventor is involved in the technology transfer process may be a factor in the considerations and ultimate recommendations of the LDR body. The LDR body, composed of one or more qualified individuals with appropriate expertise, knowledge and professional judgment, must independently check the original data and analysis upon which recommendations for the selection of licensees and for other licensing determinations were made by the institution and make its own independent recommendations concerning those decisions. The LDR may be performed by the a institution committee responsible for review and management of conflicts of interest; such committee, when undertaking an LDR, should have the expertise, knowledge and professional judgment required of the LDR body under these Guidelines.

The institution must ensure that disclosure and management of potential inventor conflicts of interest are handled in accordance with institution policy. By doing so, the institution can help ensure that the inventor may continue to participate in the technology development process while remaining in compliance with institution policies and State law in this area. Future issues may arise, such as an inventor's desire to bring technology back to the institution for further testing, development, and purchase for use in the lab as the licensee further develops the technology. If the institution becomes aware of such issues, the institution should ensure that other institution officials impacted by such activities on the part of the inventor (e.g., procurement, C&G office, Conflict of Interest review board, etc.) are educated about the rationale and processes needed for a successful technology transfer program.

### *9. Technology-specific Considerations*

The following guidance supports a general understanding of the objectives, practices and issues involved in the institution licensing program with respect to specific technologies. The licensing strategies described herein are not intended to be applied in an absolute or mechanical manner. Each licensing decision is unique and a matter of professional judgment. The institution's ALOs retain complete discretion in choosing the appropriate licensee and technology management strategy for its technologies.

#### *9.A. Research Tools*

In determining an appropriate licensing strategy for an invention that is used primarily as a research tool, the institution should analyze if further research, development and private investment are needed to realize this primary usefulness. If it is not, publication, deposition in an appropriate databank or repository, widespread non-exclusive licensing, or electing not to file a patent application may be the appropriate strategy. Where private sector involvement is necessary to assist in maintaining (including reproducing), and/or distributing the research tool, where further research and development are needed to realize the invention's usefulness as a research tool, or where a licensee has the ability to enhance the usefulness, usability, or distribution of the research tool, licenses should be crafted with the goal of ensuring widespread distribution of the final research tool to the research community. Any such license should also contain a provision preserving the institution's ability to continue to practice the licensed invention and allow other educational and non-profit institutions to do so for educational and research purposes. If carefully crafted, exclusive licensing of such an invention, such as to a distributor that will sell the tool or to a company that will invest in the development of a tool from the nascent invention, could support the institution's objectives.

One particular concern is royalties assessed on sales of products that are developed using (directly or indirectly) an institution invention that is a research tool ("reach-through" royalties), rather than assessed on products actually incorporating the institution invention. The institution should note that reach-through royalties may impede the scientific process or create unreasonable restrictions on research and therefore generally should be avoided. Licensing of research tools should encourage prompt and broad access through a streamlined process. For NIH-funded inventions, see the NIH "Principles and Guidelines for Recipients of NIH Research Grants and Contracts on Obtaining and Disseminating Biomedical Research Resources."

#### *9.B. Global Health*

While many of the licensing strategies discussed below are presented in the context of global health issues, such strategies are equally applicable to other current and future emerging technologies that can be used to support humanitarian efforts in underprivileged populations (e.g., clean water, sustainable sources of energy, food sources, etc.).

As innovative healthcare technologies are discovered and, after meeting extensive development and regulatory hurdles, introduced as publicly available therapeutic or diagnostic products, the ability of underprivileged populations to access and afford these technologies may be constrained by price or distribution. In particular, healthcare and agricultural products may not be readily accessible and affordable to the world's poorest people in developing countries and as a public institution striving to uphold its public benefit mission, the institution should consider such public benefit and broad societal needs when developing licensing strategies for such technologies.

Developing "successful practices" is an evolving process, particularly for an issue as complex as balancing access by developing countries to biomedical products with ensuring timely and appropriate development and commercialization of the product. Such practices demand creative and flexible rather than rigid approaches. Entirely new business models coupled with nuanced intellectual property management strategies may be needed to produce the desired outcomes. Each situation is

unique and must be addressed based on its own fact pattern to encourage licensees to make the substantial and risky investment necessary to develop biomedical products. Without appropriate and timely investments, the healthcare technology may never be developed into a product, thus eliminating access by all patients. A prescriptive approach may discourage licensees because of a perceived need to overcome too many obstacles in product development. Institutions frequently need to balance conflicting objectives and must be able to make compromises in the interest of moving a technology forward.

As part of the institution's public benefit mission, the institution should carefully consider patenting and licensing strategies that promote access to essential medical and agricultural innovations in developing countries. Although a multitude of downstream factors may affect the accessibility and affordability of essential technologies in developing countries, e.g. healthcare infrastructure, poverty, food security, international treaties and laws, sanitation, energy, and political stability, it remains possible for the institution to impart a profound life- changing impact in the developing countries through humanitarian patenting and licensing strategies.

One patenting strategy that the institution and its licensee might pursue is to limit patent protection to those developed countries with a healthcare infrastructure that can afford the healthcare products and not seek patent protection in developing countries thereby allowing other manufacturers to freely practice the technology. Some examples of alternate licensing strategies to consider could be: (i) inclusion in a license agreement of mechanisms to allow third parties to create competition that affects or lowers prices in developing countries, create incentive mechanisms for widespread distribution of the licensed product, or reserve a right for the institution to license third parties under specific humanitarian circumstances, (ii) inclusion of license terms requiring mandatory sublicensing to generic or alternative manufacturers in a developing country or a program that requires the distribution of the healthcare product at low or no cost to underprivileged populations with assurance that the licensee will continue to develop, manufacture and distribute the product to all such populations; and (iii) inclusion of uniquely crafted diligence provisions or other creative pricing tied to the patient's ability to afford the technology that are consistent with sponsor's march-in rights provision (if applicable).

Financial terms for products that address diseases that disproportionately affect developing countries should, where possible, facilitate product availability in the country of need. At a minimum, the financial terms should recognize the low profitability of such products. The institution could also consider foregoing royalties on products distributed in such countries or requiring the licensee to sublicense other companies if the licensee is unwilling to invest in the development of a product distribution network within that country.

To be most effective in promoting global health, the institution needs to pursue creativity and consider a wide variety of patenting and licensing strategies, since the most impactful approach in one situation may fail in others. Prescriptive guidelines dictating limited strategies could be particularly detrimental to achieving the institution's goals of public benefit. Creative patenting and licensing strategies addressing global health should focus on effectiveness and should aim to achieve the greatest impact worldwide.

#### *9.C. Software*

Because of the cross-over of software and other digital media between the patent and copyright policies, licensing of these technologies are less straight-forward than simple patent or copyright licenses. In addition, under institution Copyright Policy, an institution may have implemented procedures and supplementary local policies regarding licensure, disposition of royalty income, and other rights related to copyrights. As such, copyright licensing practices will vary from institution to institution.

#### *9.D. Diagnostics*

Licensing clinical diagnostics technologies, regardless of type (genetic or otherwise), should balance the need of the licensee to achieve a fair return on investment with the public's need to have the test as broadly available as possible, including enabling patients to obtain a second opinion by accessing the test from an alternative provider. Licenses should also reserve the right for the academic community to use the diagnostic for research purposes, including studying and independently validating the test and employing it to advance medical research. The institution will need to take into account that licensees can elect to commercialize the technology (i) as an FDA-approved kit sold to end-users, (ii) as a testing service business using an in-house Laboratory Developed Test (LDT) subject to the Clinical Laboratory Improvement Amendments (CLIA) of 1988 administered by the Centers for Medicare and Medicaid Services, or (iii) a sequential combination of (i) and (ii) whereby the licensee initially enters the market to generate near-term revenue with an LDT-based testing service and subsequently obtains market approval via the costlier and lengthier FDA review process to market a kit for sale. Licensors that have academic medical centers need to structure their licenses to take into account the needs of their own clinical laboratories to insure affordable access to the licensee's FDA-approved kit or to have the right to provide an LDT in their CLIA labs (either as a carve-out or an affordable sublicense from the licensee).

For markets that can reasonably support two diagnostics developers (e.g. melanoma), the institution should consider co-exclusive licensing. However, for more limited markets, in order to assure maximum availability and multiple sources, the institution might consider such approaches as (i) a time-limited exclusive license that automatically converts to a nonexclusive license after several years, or (ii) a license grant for the exclusive right to sell and a non-exclusive right to make and use the patented technology. In this way the licensor can be the sole provider of an FDA-approved kit while clinical labs that cannot afford the kit can still serve patient needs with their own LDTs.

Lastly it is important to appreciate that whereas a single-source provider of an FDA-approved kit provides patients with a uniform, consistent product, LDTs developed by different clinical labs (commercial and academic) may vary in performance quality and have different degrees of false-positive and false-negative results. Thus a given patient's diagnostic outcome could vary depending on which CLIA lab performs the test.

However, insuring test availability from more than one source can mitigate the variability from center-to-center.

#### *9.E. Genetic Resources/Traditional Knowledge*

## INSTRUCTION, RESEARCH AND STUDENT AFFAIRS

### JUNE 20, 2013

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Country laws or international treaties may influence licensing decisions where inventions are derived from genetic resources or traditional knowledge. The institution should investigate all project sponsored or collaborative research agreements, including material transfer agreements, to identify if any genetic resource or traditional knowledge was used in making the invention and if any specific requirements apply to the use of such resources. In some situations, the requirement may be attached to a collection permit or a visa document.

Even in the absence of such laws, treaties or contractual requirements, the institution should carefully consider biodiversity issues and negotiate individual agreements that recognize the origin or source of the material. Where possible, such agreements should consider benefit sharing arrangements with indigenous and custodial communities or governments in consideration for access to such biological material or traditional knowledge.

#### *9.F Emerging Technologies*

Over time, whole new fields of technology and innovation will emerge that will raise new issues for consideration. As with any emerging technology area, the evolution of "successful practices" will require careful and conscientious decisions that may vary from previously released guidance. The institution should thoughtfully consider how best to address these emerging issues so as to optimally manage institution-developed technologies for public benefit.

#### 10. Assignment of Ownership of Institution Intellectual Property

Under certain circumstances, the institution may be required by federal law to assign rights in institution intellectual property to the federal government. In those instances when the institution determines that it is not interested in pursuing protection and commercialization, the institution may also find it necessary, under federal law and institutional policy, or desirable, in the absence of legal or contractual requirements, to assign rights in institution intellectual property to the original institution inventor(s) or author(s). In such cases, the assignment of institution intellectual property is considered appropriate. These Guidelines presume, however, that licensing is the most appropriate mechanism for commercialization of the public asset that is the institution's intellectual property. Except with respect to assignments to those board-approved research foundations affiliated with the institution, assignment of institution intellectual property to a third party, for commercialization or use by the third party, should be a rare occurrence. Any such assignment should be negotiated on a case-by-case basis, dependent on unique circumstances that demonstrate that a license is not appropriate, and should be made only with the approval of the institution president, or his or her designee. In no case should the institution make a present assignment of future rights in institution intellectual property.