UNIVERSITY OF LOUISIANA AT LAFAYETTE

STEP Committee

Technology Fee Application

Materials and Manufacturing Hardware and Software Improvements for UL Engineering

Title

Jonathan Raush

Name of Submitter

(Faculty or Staff Only)

Department of Mechanical Engineering

Organization

Title: Assistant Professor Date: Jan. 15, 2020
Name (Contact Person): Jonathan Raush
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Phone Number: 482-1807 Email: jraush@louisiana.edu
Department/College/Org: Dept. of Mechanical Engineering/College of Engineering

ABSTRACT (250 words or less):

This proposal is being submitted to improve the available materials and manufacturing processes training resources in the College of Engineering by implementing an upgrade to an existing ANSYS/GRANTA software package and through the purchase and implementation of a melting/casting system for alloying and casting projects. The upgrades will be integrated into materials, manufacturing processes and design courses offered by the Mechanical Engineering, Industrial Technology, Chemical and Civil Engineering Departments affecting over 2000 students on campus. Funding this project will provide this large pool of students access to state-of-the-art tools intended to improve their instruction and exposure to the necessary skills and knowledge needed to be competitive in the workplace. The project will bring college resources to industry standard where there is currently a deficiency in the simulation and design of these critical methods and processes. Currently, students receive access to a basic GRANTA license which –although valuable- is limited to basic material class data without the detail needed for accurate representation and selection of many engineering materials. In addition to providing industry standard detail, the upgrade will include an EcoAudit tool for incorporating Sustainability in engineering design – a prominent University theme. Current hardware for melting and casting includes the use of a custom constructed furnace whose performance limitations inhibits student impact and learning. Industry standard hardware will not only improve student learning but increase the quantity and quality of experiential activity. Students will receive training in methods and processes that will be necessary to remain competitive and relevant.

Instruction Sheet:

1. Complete the cover page.
2. Complete the abstract page.
3. Give a description of your proposal in 12 pt. font, single spaced, addressing the following points:
    a. Purpose of grant and impact to student body as a whole
    b. Projected lifetime of enhancement
    c. Person(s) responsible for
        i. Implementation
        ii. Installation
        iii. Maintenance
        iv. Operation
        v. Training (with qualifications)
    d. The narrative of the proposal must include the purpose and justification for each of the items listed in the Budget Proposal.
4. Complete the Budget Proposal form.
5. Include any additional information relevant to your application.
6. Discuss all previous funded STEP projects (if any).

ONE ELECTRONIC COPY (Microsoft Word or Adobe PDF) OF PROPOSAL SHOULD BE EMAILED TO
stepproposal@louisiana.edu
BY DEADLINE DATE.

For additional submission instructions and deadlines, please visit http://cio.louisiana.edu/step-process

NO HARD COPY SUBMISSIONS WILL BE ACCEPTED!

A. Purpose of Grant

A critical and often neglected component of engineering design is the practice of Concurrent Engineering incorporating materials selection and manufacturing process design along with traditional design (stresses, strains) for the part under consideration. Poor material or manufacturing process selection can lead to a failed component or part – often in a catastrophic manner. These design considerations affect students in chemical engineering, mechanical engineering, civil engineering, and industrial technology. Currently, these Departments cover material and process selection as a limited discussion in design courses, separately from the only required material science course of CHEE 317 (which not all departments require). However, there are currently very limited design tools available for training students in the use of material selection or design concepts and in the analysis of the effects, such as performance, availability, and costs, which can have huge consequences on the project success.

In 2019 the PI acquired a license from GRANTA for its CES EduPack tool to begin requiring students to train in an application used by many industry engineers (Figure 1). Figure 2 below shows a portion of a report generated by students using this application for an assignment in the Fall, 2019 semester. CES EduPack is a unique set of teaching resources that support Materials Education across Engineering, Design, Science and Sustainable Development. It is not just a stand-alone selection system, but a resource that can be integrated into broader lectures and student exercises. The tool has licenses at several levels of data available for purchase and the most basic available (Basic Engineering) was acquired by the PI. The proposed project would upgrade this license to the Engineering Edition which will include data for 3900 types of engineering materials as opposed to 100 for the current Basic license (adding particular alloys, polymers and composites as opposed to only classes of alloys and polymers).

In addition to providing industry standard detail, the upgrade will include an EcoAudit tool for incorporating Sustainability in engineering design – a prominent University theme. Engineering curricula increasingly require coverage of sustainability. This is a complex, multi-disciplinary subject, and introducing it to students can be a challenge. CES EduPack provides tools, sustainability-related data, and a methodology to help.

Learning outcomes supported by the Engineering Edition include:

- Understand classes of materials, their properties, and the underlying reasons for those properties.
- Understand the interaction between materials and manufacturing processes and how this affects selection and design.
- Understand systematic selection of materials and processes using constraints and objectives.
- Awareness of the impact of products on the environment and how to design in a way that reduces this impact.
- Identify solutions to real engineering problems (i.e. in capstone design projects) using comprehensive materials and process data.

Resources such as GRANTA are offered by many of our peer institutions (LSU) and used by a whole variety of industry. Choosing the right material for an engineering application, or finding a suitable replacement, is a key skill in industry. A cross-section of industry who use this particular software include: Airbus, Boeing, General Motors, Rolls-Royce, Renault, Honeywell, NASA, DOW, Novo Nordisk, Saudi Aramco, as well as hundreds of Universities.

The application will support both introductory courses such as CHEE 317, where resources allow students to explore the relationships between the Processing, Structure and Properties of materials – and advanced courses where the synthesizer tool allows students to explore new and hybrid materials. This application in combination with the ability to melt/cast alloys provides the holistic experience needed for future engineers.

Current hardware for melting and casting includes the use of a custom constructed furnace whose performance limitations inhibits student impact and learning. Industry standard hardware will not only improve student learning but increase the quantity and quality of experiential activity. Students will receive training in methods and processes that will be necessary to remain competitive and relevant in the future.

The new furnace will employ rapid cycle times of 6 minutes after initial preheating of 40 minutes (Figure 4). The current method for melting involves a heating time of 3-4 hours, limiting melting activity to just one day per semester. The controlled atmosphere system will also aid in improved material quality such that casted parts could be utilized in applications (senior design, research, etc.), whereas currently casted parts are useful for demonstration only. The furnace will also allow alloying of different elements in line with material design applications – especially useful for graduate student applications. The use of the furnace will facilitate advanced materials research and application, in line with the University and statewide emphasis on advanced manufacturing and materials.

Advanced manufacturing applications in aerospace, automotive, healthcare, and consumer product sectors are forecasted for 20-30% annual revenue growth. In order to utilize advanced manufacturing to its fullest potential, engineers and designers must be trained. Such courses are offered by top universities. The goal of this project is to provide UL students the opportunity to receive proper training in conventional as well as the emerging fields of advanced manufacturing.

The purpose of this grant is therefore the acquisition and implementation of two upgrades in materials and manufacturing training resources. The commercial package ANSYS/GRANTA is used by engineers around the world to simulate and select engineering materials in various industries including aeronautics, automotive, energy, and defense. The commercial grade furnace from MTI will provide the capability to conduct high quality melting, alloying, and casting of engineered materials and parts, upgrading students learning experience and opportunities.

With the help of these tools, our students will be able to optimize the materials and processes within a Concurrent Engineering paradigm. The proposed software and hardware can be implemented into current materials, manufacturing processes, and design courses. Both will expose students to the effects of materials and processes on the design of parts and systems. The successful implementation of this training will prepare UL engineering students for the workplaces of the twenty-first century. In addition, this training supports and improves outcomes relative to ABET accreditation.

Impact on Student Body

This initiative will impact students in the following ways:

1. Improvement of the current offering of materials, manufacturing, and design related software to more fully represent today's engineering workplace. The many departments within the College of

Engineering that utilize this training will benefit from the improvement.
2. Students currently have limited to no experience with several manufacturing processes such as melting, casting, and alloying. This project will improve experiential learning activity with these processes, learning outcomes, and research opportunities.
3. The students have limited interaction with materials selection and no experience with design involving materials selection software aligned with Concurrent Engineering methodologies. Students will be expected to have a level of proficiency in the workplace when entering with an engineering degree. They need the exposure to the tools of the future workplace, especially with developing and advanced manufacturing materials and processes.
4. For processes in which the university doesn't have the resources to acquire equipment (metals 3-D printing, laser cutting, etc.) or allotment in the curriculum to teach processes, this software will provide an easy-to-use method for exposure the students may need to understand the process and its limitations and advantages.
5. Students will have an advantage over those from other colleges when entering the workplace, making them more competitive for future design or advanced manufacturing jobs.
6. Students will value leaving a program having experienced cutting edge technologies which they can bring to businesses and other educators.

B. The Projected Lifetime of Enhancement

These upgrades are expected to last for at least 10 years, as the proposed package represents an industry standard in materials selection that ensures the software will remain current and relevant for the foreseeable future. The hardware has an expected lifetime of 10-20 years for the application proposed.

C. Person(s) Responsible for Project

a. Implementation: Jonathan Raush, College of Engineering
b. Installation: Harvey Ozbirn, College of Engineering (software); Jeff Guidry, Mechanical Engineering (hardware)
c. Maintenance: Harvey Ozbirn, College of Engineering; Jeff Guidry, Mechanical Engineering (hardware)
d. Operation: Jonathan Raush, College of Engineering
e. Training: Jonathan Raush, College of Engineering

Qualifications:

Jonathan Raush is currently an Assistant Professor in the Department of Mechanical Engineering. He has held this position since 2016. He holds a Ph.D. from Louisiana State University in Mechanical Engineering. He specializes in advanced manufacturing of metal alloys and advanced materials design.

Harvey Ozbirn is currently the computer systems manager for the College of Engineering. He has held this position since 1999. He holds a Master's degree in Business Administration from the University of Southwestern Louisiana and a Master of Science in Engineering Technology & Management from the University of Louisiana at Lafayette.

Jeffrey Guidry is the Machine Shop Supervisor in the Department of Mechanical Engineering. He has held this position since 2000. He has a Bachelor of Science in Industrial Arts Education, from the University of Louisiana at Lafayette. He has assisted with MCHE 365 Manual Machining Labs

(including casting), assisted Senior Design student projects and competition projects in machining and welding lab, and assisted Graduate Research Students and research professors in customizing research equipment campus wide.

Budget Proposal

1.	**Equipment**	**$16,521**
2.	**Software**	**$5,200**
3.	**Supplies**	**$0**
4.	**Maintenance**	**$2,000**
5.	**Personnel**	**$0**
6.	**Other**	**$0**
	TOTAL:	**$23,721**

Timeline:

Year 1:

Order software site license. Order equipment.

Install software and equipment, implement into course modules in MCHE, ITECH, CIVE, CHEE

Year 2:

Further implement into course modules, software maintenance. It is anticipated that following Year 2, maintenance fees for the software will be allocated from alternative sources.

Year 3:
Maintenance
Year 4:
Maintenance

Budget Proposal

Length of Implementation (In years)	1	2	3	4
1. Equipment	$0	$0	$0	$0
2. Software	$21,721	$2,000	$0	$0
3. Supplies	$0	$0	$0	$0
TOTAL:	$21,721	$0	$0	$0

Previously Funded STEP Grants
Jonathan Raush has one previously funded STEP grant project:
Implementation of Virfac® (Virtual Factory) Software Package for a total cost of $27,000. The purpose of this grant was the acquisition and implementation of a virtual factory simulation environment. Commercial packages are used by engineers around the world to simulate welding, additive manufacturing, machining, heat treatment and damage resistance in various industries including aeronautics, automotive, naval and nuclear. Additive Manufacturing is a latest software addition. The grant facilitated software acquisition and implementation in this regard.

D. Software Images and Examples
grantadesign.com

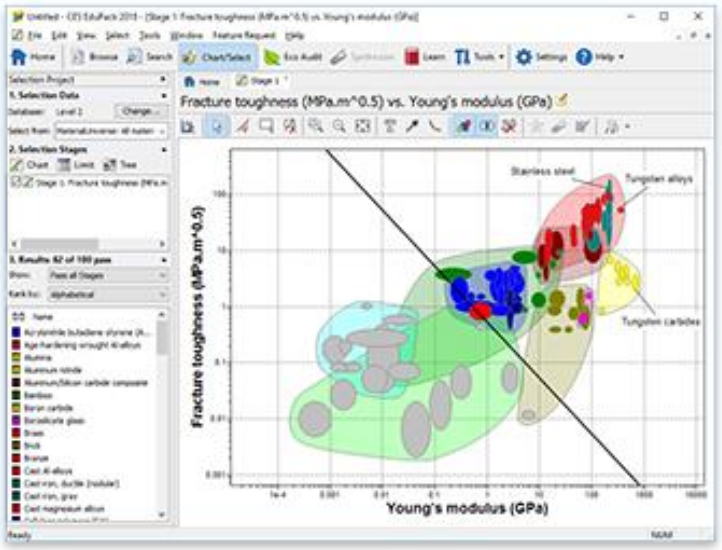

Figure 1. Users can learn about materials in the real world by applying rational, systematic methods to select materials for specific engineering applications.

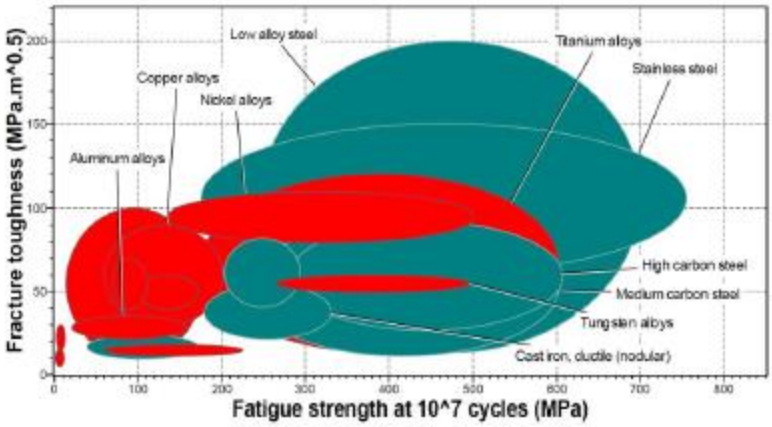

Figure 2a: GRANTA Results showing optimal materials Fracture Toughness vs Fatigue Strength

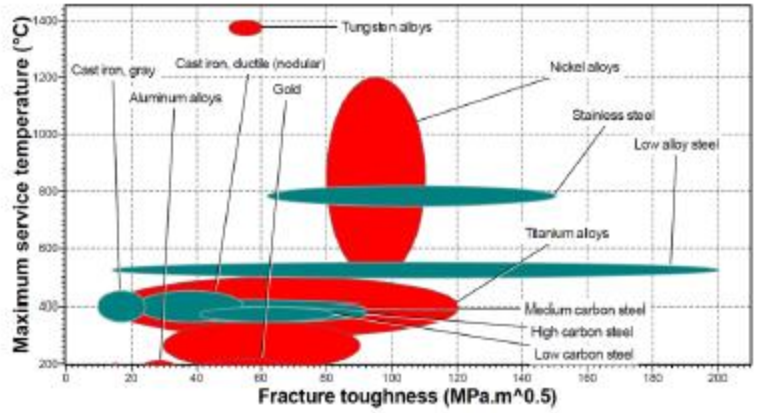

Figure 2b: GRANTA Results showing optimal materials Maximum Service Temperature vs Fracture Toughness

Figure 2. An excerpt from a student report in MCHE365, Fall 2019, using the Basic license.

Eco Audit Tool

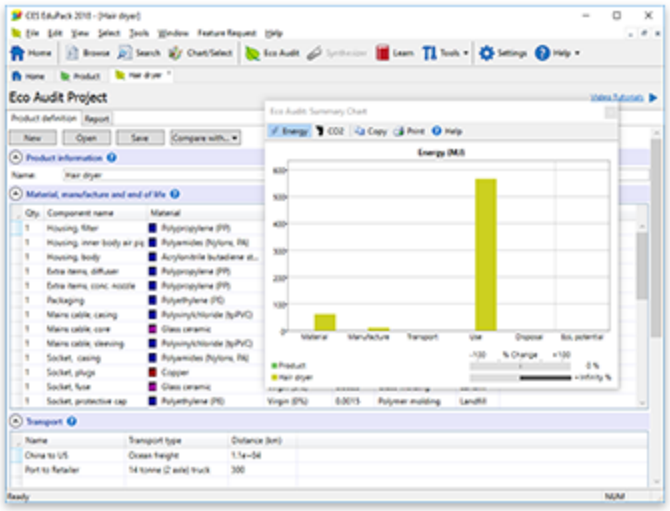

Figure 3. Eco-impact tool. Evaluates the environmental impact of a product. Users can test design scenarios and understand the importance of material and process choices.

Synthesizer

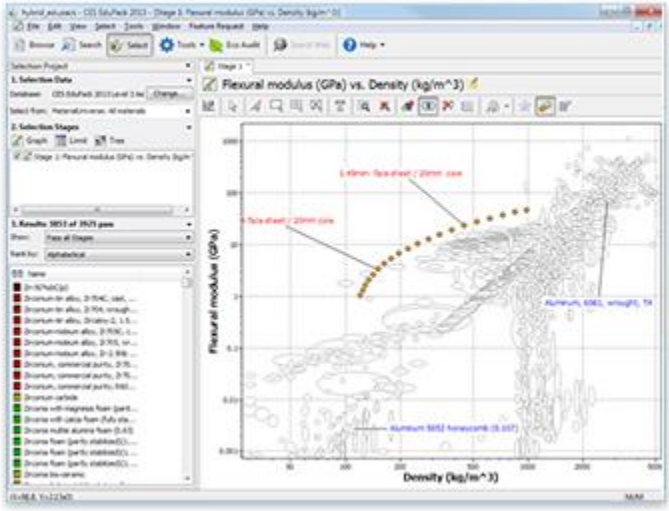

Figure 4. Synthesizer. Users can apply models to the data to predict the properties of hybrid materials and compare them with conventional materials – ideal for advanced projects

Figure 5. Melting and casting furnace with controlled atmosphere from MTI.

Reference: BO060120201
Date: 06 January 2020
Valid until: 28 February 2020

To:
University of Louisiana at Lafayette

Department of Mechanical Engineering, Rougeau Hall, 241 E Lewis St. Lafayette, LA 70503

QUANTITY	DESCRIPTION	PRICE USD $
	10 seats Engineering Edition (Level 3) Perpetual	14,700.00
	10 seats Basic Edition (Level 2) Perpetual	9,500.00
	Upgrade from 10 seats Basic to 10 seats Engineering	5,200.00
	SUBTOTAL	5,200.00
	10 % DISCOUNT FOR ORDER PLACED BEFORE April 30th, 2020	-520.00
		0.00
		0.00
	SHIPPING &HANDLING	0.00
	TOTAL USD $	**4,680.00**

Other Notes:

- Granta Design Limited is the sole supplier of CES EduPack and CES Selector

Account Number _____

LICENSE FORM

LICENSEE NAME: University of Louisiana at Lafayette

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Department of Mechanical Engineering, Rougeau Hall, 241 E Lewis St. Lafayette, LA 70503

Installation Site:
(if different from above)

Installation Site Address:
(if different from above)

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LICENSOR:	**LICENSEE:**
ANSYS, Inc.	
2600 ANSYS Drive	
Canonsburg, PA 15317	
USA	
By:	By:
(Signature)	(Signature)
(Printed Name)	(Printed Name)
(Title) (Date - mm/dd/yyyy)	(Title) (Date - mm/dd/yyyy)

Information We Need to Support You

Who will organise the use of CES EduPack?

GRANTA Teaching Resources
Materials Education Teaching Resource Community

Main Academic Contact

Title: _____ First Name: _____ Last Name: _____

Position: _____ Department: _____

Telephone: _____ E-mail: _____

Main Purchasing Contact

Title: _____ First Name: _____ Last Name: _____

Position: _____ Department: _____

Telephone: _____ E-mail: _____

Main IT Contact

Title: _____ First Name: _____ Last Name: _____

Position: _____ Department: _____

Telephone: _____ E-mail: _____

Who will use CES EduPack?

We will use this information to understand how to help you get the most out of CES EduPack, who should be covered by the license and set up access to Granta's Teaching Resources Website.

This website has 300+ teaching resources to support Materials teaching across Engineering, Design and Science.

Course Name	No. students	Department	Educator Name and Email	Receive News	Web Training
				☐	☐
				☐	☐
				☐	☐
				☐	☐
				☐	☐
				☐	☐

You and your colleagues can **edit these details or subscribe to training and newsletters** in the future here:
http://teachingresources.grantadesign.com/online-events

Good To Know…

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Sole Supplier: **Granta Design is the developer and sole supplier of CES EduPack.**

See last page for Conditions of Sale and Bank Details.

USA: W8-BEN: We are happy to give you a copy of our W8-BEN tax form. If there are other forms your state require please let us know.

Prices exclude VAT. UK customers are charged VAT at prevailing rate. European customers may be liable to pay VAT if no VAT number is provided. Other customers are not liable for VAT. Bank details on last page.

Training

CES EduPack is intuitive to use and does not usually require training. Students and educators can watch video tutorials to help them get started (found in **Help button inside CES EduPack and Support link below**). However, we all want inspiration sometimes, and educators are welcome to attend free, online, monthly, web seminars to get ideas and see how other people in the Materials Education Community teach using CES EduPack.

We also run one-day courses of hands-on teaching about how CES EduPack can be used in the contexts of Materials Selection, Materials and Design, Green Engineering and Sustainability. To attend a training session or arrange for us to run a short course at your institution, please go to **www.grantadesign.com/education/training** or here: **https://grantadesign.com/education/events/**

Delivery

When you place your order for CES EduPack you will receive an online delivery (no shipping costs): A confirmation email (including how to download and install the software), how to access the **Teaching Resources Website**, and links to useful information to help you start planning your course.

Support

Educators using CES EduPack join a world-wide community. They can download teaching resources, share ideas and gain inspiration by using the Teaching Resource Website:
www.grantadesign.com/education/teachingresources/

Customers will receive software technical support by email and phone and access to the Teaching Resource Website for the duration of the License period, or if you have a maintained perpetual license.
Network Administrators can find out more here: **https://grantadesign.com/education/support/ces-edupack-support/faqs-from-it-administrators/**

www.grantadesign.com/education/support/

www.grantadesign.com/education/teachingresources/

More Information

Overview of CES EduPack

CES EduPack is a unique set of teaching resources that support Materials Education across Engineering, Design, Science and Sustainable Development. It is currently used by over 1,000 universities and colleges worldwide. You can find user reviews on this link:

http://www.grantadesign.com/education/reviews/

Materials are integral to these subjects. So understanding materials, the way that they are processed, and their impact on the engineering, economic, and environmental behavior of products is essential across this range. CES EduPack and its associated resources help you to develop this understanding. CES EduPack Editions tailor the experience of students and educators by presenting relevant information, resources and tools.

See all CES EduPack Editions and Tools:

http://www.grantadesign.com/education/editions/editions.htm

Licensing

This is not a floating or concurrent user license. A **'unique student'** is defined as an individual student or academic who will use the software at some point during the License period. An **'Enrolment-based'** Teaching License covers 1, 2 or 3 academic years. It is very flexible once user numbers have been agreed (typically on a course-by-course or department-by-department basis). All Licenses are subject to a minimum number of 50 'unique students' of any one CES EduPack Edition and a minimum total of 100 'students'. **Volume discounts** are available for 200 users and above. If the number of users is greater than 400 please ask Granta for Campus-wide options.

The **Enrolment-based / Campus-wide** License enables: installation of the CES EduPack software on any university or institute PC AND distribution for installation on students' and academics' home PCs. It also allows the university or institute to charge students a fee for the software.

A **'PC seat-based' Lab Teaching License** is a perpetual license that enables universities or institutes to use CES EduPack software with students for teaching on a number of fixed PC seats. These Licenses are subject to a minimum number of 10 x PC seats of any one CES EduPack Edition. Customers will receive the software via download for network/PC installation. A volume discount applies on all Licenses with more than 20 PC seats. After the initial maintenance period expires the CES EduPack software may be kept up-to-date by taking out an additional Maintenance Contract, that give continued access to the teaching resources and the latest software version.

System Requirements

To install CES EduPack on your PC, you will need the following:

- A compatible Microsoft® Windows® operating system;
  - Windows 7 32-bit or 64-bit,
  - Windows 8 32-bit or 64-bit.
  - Windows 10 32-bit or 64-bit.
- 4 GB of RAM.
- 4 GB of available hard disk space.
- Internet connection (for web-based search capabilities).
- Microsoft .NET Framework version 4.0 and ReportViewer 2010 SP1. For the French language installation you will also require the French language packs for both of these. If any of these are not already installed, you will be given the option to add them to the CES EduPack installation process.
- Administrator rights.

General Conditions of Sale

1. All prices are exclusive of UK sales VAT, any duties, customs clearance charges and local taxes.

2. Payment terms: 30 days from date of invoice.

3. When installing CES EduPack or other software or data products, customers must agree to the standard license terms provided with the product. Custom extensions to the CES EduPack software, developed by Granta and provided to the customer, are deemed to be governed by the same license agreement.

4. Methods of payment: Payment may be made by bank transfer direct into our account (details below), by cheque or by credit card (Visa, MasterCard).

5. This quotation is valid until: 28 February 2020

6. Bank Details:

    Barclays Bank Plc
    15 Bene'T Street
    Cambridge
    CB2 3PZ
    Account Name: Granta Design Ltd.
    Sort Code: 20-17-68
    SWIFT Code: BARC GB 22
    Account Number: 78919877
    IBAN code: GB13 BARC 2017 68 78 9198 77

    Company Registration Number: 2807306
    VAT Number (Tax ID): GB 636 85 80 05

Address:

Granta Design Ltd.
62 Clifton Road
Cambridge CB1 7EG, UK

www.grantadesign.com
Tel : +44 1223 518895
Fax : +44 1223 506432

To:	Granta Design Limited	**Fax:**	+44 1223 506432
Subject:	CES EduPack Maintenance Order	**E-mail:**	granta.education@ansys.com

Order Form for Perpetual Lab Maintenance

Quotation Reference Number: BO060120201TECS

Product	Option A 1 Year USD $	Option B 3 Year USD $	Option C 5 Year USD $
Previous maintenance contract expiry date: 28-Feb-2020 - Back maintenance fee		0.00	
Renewal of maintenance contract for 10 seats CES EduPack Basic Engineering and Design (formerly Design) Editions. This includes: - CES EduPack software updates - Access to the most recent engineering materials datasets - Full access to the Granta Education Hub - Technical support & training webinars	1,710.00	4,560.00 Equivalent to 1,520.00/yr	6,650.00 Equivalent to 1,330.00/yr
New maintenance valid until:	28-Feb-2021	28-Feb-2023	28-Feb-2025
Sub-total	1,710.00	4,560.00	6,650.00
10.0% Discount for an order placed before 10-Feb-2020	**-171.00**	**-456.00**	**-665.00**
Shipping Costs	**0.00**	**0.00**	**0.00**
TOTAL USD $	**1,539.0**	**4,104.0**	**5,985.0**
Select option:	☐	☐	☐

Delivery Address	**Invoice Address**
E-mail:	E-mail:
Telephone:	Telephone:

Please debit my credit card ☐ Visa ☐ Mastercard ☐ American Express

Card Number: _____

Expiry Date: _____ Security Code (CVV): _____

Name on Card: _____

Cardholder's Signature: _____

Cardholder's Address: _____

Account Number _____

LICENSE FORM

LICENSEE NAME: University of Louisiana at Lafayette

SECTION 1: DESIGNATED SITE*:

Designated Site Address:
Department of Mechanical Engineering, Rougeau Hall, 241 E Lewis St. Lafayette, LA 70503

Installation Site:
(if different from above)

Installation Site Address:
(if different from above)

* If Licensee is issuing a purchase order for more than one location and/or more than itself or one of its Affiliates, then the Designated Site for specific Program licenses shall be as set forth in the Quotation and not the Designated Site indicated above.

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LICENSOR:	**LICENSEE:**
ANSYS, Inc.	
2600 ANSYS Drive	
Canonsburg, PA 15317	
USA	
By:	By:
(Signature)	(Signature)
(Printed Name)	(Printed Name)
(Title) (Date - mm/dd/yyyy)	(Title) (Date - mm/dd/yyyy)

Information We Need to Support You

Who will organise the use of CES EduPack?

Main Academic Contact

Title: _____ First Name: _____ Last Name: _____

Position: _____ Department: _____

Telephone: _____ E-mail: _____

Purchasing Contact

Title: _____ First Name: _____ Last Name: _____

Position: _____ Department: _____

Telephone: _____ E-mail: _____

IT Contact

Title: _____ First Name: _____ Last Name: _____

Position: _____ Department: _____

Telephone: _____ E-mail: _____

Who will use CES EduPack?

We will use this information to understand how to help you get the most out of CES EduPack, who should be covered by the license and set up access to Granta's Teaching Resources Website.

This website has 300+ teaching resources to support Materials teaching across Engineering, Design and

Course Name	No. students	Department	Educator Name and Email	Receive News	Web Training
				☐	☐
				☐	☐
				☐	☐
				☐	☐
				☐	☐

You and your colleagues can **edit these details or subscribe to training and newsletters** in the future here:
http://teachingresources.grantadesign.com/online-events

Good To Know…

Purchasing Department

Sole Supplier: **Granta Design is the developer and sole supplier of CES EduPack.**

See last page for Conditions of Sale and Bank Details.

USA: W8-BEN: We are happy to give you a copy of our W8-BEN tax form. If there are other forms your state require please let us know.

Prices exclude VAT. UK customers are charged VAT at prevailing rate. European customers may be liable to pay VAT if no VAT number is provided. Other customers are not liable for VAT. Bank details on last page.

Training

CES EduPack is intuitive to use and does not usually require training. Students and educators can watch video tutorials to help them get started (found in **Help button inside CES EduPack and Support link below**). However, we all want inspiration sometimes, and educators are welcome to attend free, online, monthly, web seminars to get ideas and see how other people in the Materials Education Community teach using CES EduPack.

We also run one-day courses of hands-on teaching about how CES EduPack can be used in the contexts of Materials Selection, Materials and Design, Green Engineering and Sustainability. To attend a training session or arrange for us to run a short course at your institution, please go to **www.grantadesign.com/education/training** or here: **https://grantadesign.com/education/events/**

Delivery

When you place your order for CES EduPack you will receive an online delivery (no shipping costs): A confirmation email (including how to download and install the software), how to access the **Teaching Resources Website**, and links to useful information to help you start planning your course.

Support

Educators using CES EduPack join a world-wide community. They can download teaching resources, share ideas and gain inspiration by using the Teaching Resource Website:
www.grantadesign.com/education/teachingresources/

Customers will receive software technical support by email and phone and access to the Teaching Resource Website for the duration of the License period, or if you have a maintained perpetual license.
Network Administrators can find out more here: **https://grantadesign.com/education/support/ces-edupack-support/faqs-from-it-administrators/**

www.grantadesign.com/education/support/

www.grantadesign.com/education/teachingresources/

More Information

Overview of CES EduPack

CES EduPack is a unique set of teaching resources that support Materials Education across Engineering, Design, Science and Sustainable Development. It is currently used by over 1,000 universities and colleges worldwide. You can find user reviews on this link:

http://www.grantadesign.com/education/reviews/

Materials are integral to these subjects. So understanding materials, the way that they are processed, and their impact on the engineering, economic, and environmental behavior of products is essential across this range. CES EduPack and its associated resources help you to develop this understanding. CES EduPack Editions tailor the experience of students and educators by presenting relevant information, resources and tools.

See all CES EduPack Editions and Tools:

http://www.grantadesign.com/education/editions/editions.htm

Licensing

This is not a floating or concurrent user license. We find that students often want to do their homework at the same time (the last hour before the deadline). Therefore, this model does not work for us.

A 'PC seat-based' Lab Teaching License is a perpetual license that enables universities or institutes to use CES EduPack software with students for teaching on a number of fixed PC seats. These Licenses are subject to a minimum number of 10 x PC seats of any one CES EduPack Edition. Customers will receive the software via download for network/PC installation. A volume discount applies on all Licenses with more than 20 PC seats. After the initial maintenance period expires the CES EduPack software may be kept up-to-date by taking out an additional Maintenance Contract, that give continued access to the teaching resources and the latest software version.

System Requirements

To install CES EduPack on your PC, you will need the following:
• A compatible Microsoft® Windows® operating system;
Windows 7 32-bit or 64-bit,
Windows 8 32-bit or 64-bit.
Windows 10 32-bit or 64-bit.
• 4 GB of RAM.
• 4 GB of available hard disk space.
• Internet connection (for web-based search capabilities).
• Microsoft .NET Framework version 4.0 and ReportViewer 2010 SP1. For the French language installation you will also require the French language packs for both of these. If any of these are not already installed, you will be given the option to add them to the CES EduPack installation process.
• Administrator rights.

General Conditions of Sale

1. All prices are exclusive of UK sales VAT, any duties, customs clearance charges and local taxes.

2. Payment terms: 30 days from date of invoice.

3. When installing CES EduPack or other software or data products, customers must agree to the standard license terms provided with the product. Custom extensions to the CES EduPack software, developed by Granta and provided to the customer, are deemed to be governed by the same license agreement.

4. Methods of payment: Payment may be made by bank transfer direct into our account (details below), by cheque or by credit card (Visa, MasterCard).

5. This quotation is valid until: 28 February 2020

6. Bank Details:

   Barclays Bank Plc
   15 Bene'T Street
   Cambridge
   CB2 3PZ
   Account Name: Granta Design Ltd.
   Sort Code: 20-17-68
   SWIFT Code: BARC GB 22
   Account Number: 78919877
   IBAN code: GB13 BARC 2017 68 78 9198 77

   Company Registration Number: 2807306
   VAT Number (Tax ID): GB 636 85 80 05

Address:

Granta Design Ltd.
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www.grantadesign.com
Tel : +44 1223 518895
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MTI Corporation
www.mtixtl.com

860 South 19th Street, Richmond, CA 94804 USA
Tel: 510-525-3070 Fax: 510-525-4705 email: vincent@mtixtl.com

Quotation (011420V-LA-VMCS1200)

SHIPPING ADDRESS:

Dr Jonathan, Raush
University of Louisiana at Lafayette
P.O. Box 43678,
Lafayette, LA, 70504

337-482-1807
jraush@louisiana.edu

BILLING ADDRESS:

Line	Description	Qty.	Unit. USD	Ext. USD
1	Compact 1200C Atmosphere Controlled Melting/Casting System (2 Kg Max) w/ Start-up Kit - EQ-VMCS-1200-LD	1	$15,996.00	$15,996.00
			Sub total	$15,996.00
			Crating/Handling	$60.00
			(LTL Freight) Shipping	$465.00
			Total	$16,521.00

Payment Term:	**T/T Advance**	****Tax will be added for all orders shipping to California*
Beneficiary:	MTI Corporation, 860 South 19th Street, Richmond, CA 94804 USA	
Beneficiary Bank:	Citibank, 1377 Solano Ave, Albany, CA 94706 USA Tel: 1-510-525-1145	
Account# 601207467	**ABA# 321171184**	**Swift# CITIUS33**

Warranty and Terms:

* One year (12-month) manufacture limited warranty and free replacement on all defective parts (not including spare parts) caused by manufacture, but do not apply to any damaged part(s) caused by misuse or accident. Manufacture reserves the right to inspect all defective claims.
* Any defect(s) must be reported immediately after receipt of shipment and the reasonable proof related to the defect(s) is required.
* 25% restocking fee will be charged on all refunded items: item(s) must be in unused condition and retain all the original packing materials.
* Labor cost, special order item(s), and other service related costs are non-refundable. Shipping & handling is non-refundable.

Please kindly read "Terms & Condition" at http://www.mtixtl.com/terms.aspx before issuing any PO. Once PO is issued, No cancellation is accepted for customization or UL/CSA certified product

Est. Lead Time: 6-8 weeks after payment received		**Validity: 60 days from the issued date**
Issued By: Vincent Mok	**Signature:** *vincent*	**01/14/20**