IT Action Plan

Michael Soltys

July 23, 2015

Below find attached the IT Action Plan. Please note the following important points:

1. This Action Plan is based on the recommendations in an External Review Report conducted during February 25-26, 2014, regarding the Bachelor of Science in Information Technology (IT) at CI. The reviewers were Dr. Eric Tao (CSU Monterey Bay) and Dr. Wayne Iba (Westmont University). It is also based on the input regarding the review from the AVP (Dr. Karen Carey) and the Provost (Dr. Gayle E. Hutchinson), and on a document containing preliminary ideas for the Action Plan, authored by Dr. Peter Smith (Chair of the department of Computer Science / IT at the time of the External Review).
2. The review was finished during the last months of Dr. Peter Smith's term as chair of the department of Computer Science / IT, and the duty of writing an Action Plan based on the review fell on the new chair, Dr. Michael Soltys, a new hire at CI, starting in August 2014. Hence the delay in the submission of this document, as the new chair had to become familiar with the issues surrounding the department, and IT in particular.
3. As was noted, compared to other programs undergoing a 5 year review, IT is relatively immature and still in flux. All the pointes raised by the reviewers can be traced to the following four issues:
   a) The program lacks a focus; we suggest to specialize in Security, e-Health, or Business/Management
   b) There is no senior Tenure Track faculty who specialize, and do research, in IT
   c) The program does not have a dedicated director
   d) The program does not have an IT technician
4. Our response to the above 4 problems: we can find a focus in two years (by September 2017); we will attempt to hire a senior faculty but not at the expense of not hiring in Computer Science; given that we are four faculty at the moment, and only two of us are senior, a serious director is contingent on hiring; we hope that now that we have the new Sierra Labs, there will be money allocated for a lab technician. Other issues, such as growing an internship program, interviewing outgoing students, updating the curriculum, etc., will follow naturally once the four points above are resolved.
5. We attach a current article from the Communications of the ACM, *A Technician Shortage*, by Peter J. Denning and Edward E. Gordon. This article addresses IT education issues that are relevant to our program. We also attach the ACM 2008 IT Curriculum Guidelines for Undergrad Degree Programs in IT (just the 4 first pages to indicate that this reference was used).

Program/Date	Information Technology July 23, 2015			TWO YEAR PLAN	FIVE YEAR PLAN
REVIEW RECOMMENDATIONS	**PROGRAM CITATION AND RATIONALE**	**RESPONSIBLE PARTIES**	**RESOURCE IMPLICATIONS**	**DELIVERABLE**	**DELIVERABLE**
PROGRAM PURPOSE AND UNIVERSITY GOALS					
Establish a clear mission for the BS IT program that highlight the applied nature of the degree, distinct from the Computer Science program. The differing roles that BSIT and BSCS graduates are hired to fill may help in generating this distinction.		Departmental curriculum committee.		First version in place	A mature mission plan and a mechanism for keeping it updated
Utilize a thriving internship program to establish a strong link to the 'community and service-learning' pillar. Cultivate cross- and interdisciplinary connections within the curriculum through the use of project assignments. Utilize institutional support for team-teaching.		Dedicated IT program faculty		Internship document; an IT responsible faculty	Thriving internship program in place

The program website should be strengthened with clear mission, curriculum structure, faculty bio, industry partners and testimonies from students and graduates. The reviewers feel that this represents a low-cost, high-impact opportunity.		One of the departmental duties is web site maintenance		Basic structure in place	Complete site in place
ACHIEVING EDUCATIONAL OUTCOMES/ASSESSMENT					
Review the course outcomes and realign the course numbers, the 400 level class should cover advance problem solving, research and hand-on projects.		Future program director		?	?
Restructure the outcomes to follow the program mission and university's four missions. Include more specific items in the outcomes, such as "design user interface", "manage network systems", "identify security priority", "generate script for system administration tasks". These outcomes should be reviewed during every program review		Future program director		?	?

cycle according to technology and industry changes.					
Conduct “exit interviews” and sample the graduated students’ transcript to determine if graduation can be more timely.		Future program director		?	?
Document co-curricular activities and assess their benefits to student learning. Student input should be considered. The department should regularly rehearse with students the value inherent in the more formal or theoretical aspects of the program. An annual curriculum review meeting with student and alumni representatives participation is recommended. Meeting minutes should be kept and open to all stakeholders.		Future program director		?	Advisory boards for the program should be in place at this point, and help with making recommendations for the program
Given the role that transfer students play in the BSIT program, the web site should more prominently point to information resources such as assist.org that would be helpful to students wanting to transfer.		Chair and Web site maintainer		Information for transfer students will be added to web site	Ongoing maintenance of web site with pertinent information for transfer students

DEVELOPING RESOURCES TO ENSURE SUSTAINABILITY					
Because the background of most faculty is in CS, we recommend more development and scholarship in IT areas.					
Provide funds for full-time support technician.				Absolutely essential to do this	
1. Ensure that teaching an overload is an exception rather than the rule. 2. Provide faculty evaluations for TTF and a random sample of Adjuncts in future Self-Study documents.				As the program grows in TT faculty, overload should be decreasing	
Network lab and server lab should be established soon; these are essential for the IT program.				Sierra Lab answered this need	
If a robust internship program is developed as discussed elsewhere in our recommendations, this would provide additional avenues for obtaining external funds from local industry.		Currently Puneet Sharma; this is delivered as IT 492 “Internship”		We currently have a rudimentary internship program going	Program director should take over this duty
As recommended above, a support technician may be a necessary addition for the				Absolutely necessary to run the program	

sustainability of the program.				properly	
A regular industry advisory board specific for the BS IT program is highly recommended. While it is efficient to have a joint board for CS and IT. A separate board or at least sub-committee of the board with a focus on IT is advised.		Program Chair, and since members require presidential approval, also the President's office		Board in place	Regular meetings with timely advice
CREATING A LEARNING CENTERED ORGANIZATION/STRUCTURE					
The planning should be more formal and documented. An annual planning meeting for setting goals and evaluating past performance is highly recommended. The planning should involve students and industry inputs.				There is a TT dept meeting every two weeks; there are 4 dept wide meetings a year	We plan to maintain regular meetings. The current schedule seems appropriate
Should start collecting student learning outcome data as soon as possible. Classes should identify a signature assignment, exam or project as the default portfolio component.		Director of IT		Director of IT program	
The program should continue to monitor ABET, ACM, ITIL recommendation and revise its curriculum accordingly. An		Director of IT			

annual planning meeting might be a good opportunity to do so					

The Program Action Plan is an agreement among appropriate AVPAA and Program to implement recommendations that emerged during the program review process. These recommendations were derived from the program's self-study, the external review, administrator input, and the Continuous Improvement review. Through the Program Action Plan, the goal is to integrate program review results into Academic Affairs planning and budgeting. To the extent that resources and changes in program and division strategic priorities permit, the Action Plan identifies two-year and five-year targets for implementation of recommendations.

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Peter J. Denning and Edward E. Gordon

The Profession of IT
A Technician Shortage

In our elation about rising CS enrollments, we are overlooking a growing shortage of computing technicians. Our education system is not responding to this need.

On the tenth anniversary of this column, we took stock of changes in the computing profession since 2001.[2] Computing had become the umbrella term for our field, rather than information technology (IT) as was expected in 2001; IT referred mainly to technology and business applications of computing. Several new professions had appeared within computing to support changes such as big data, cloud computing, artificial intelligence, and cyber security. Certification of important skill sets was more common, but professional licensing had not advanced very much. Finally, there was a sharp drop in enrollments in computer science departments around the world, to about 50% percent of the 2000 peak. Many considered this a paradox because computing jobs were growing and digitization was moving into every field and business.

In 2007 CS enrollments bottomed and began to rise steadily, attaining in 2013 75% of the peak level. Surveys show students are taking up computing not so much because they expect good salaries, but because they perceive computer science as compatible with almost every other field. A major in computer science gives the flexibility of deferring a career choice until graduation.

This reversal has brought great rejoicing among computer science academic leaders. Their attention is focused on coping with the surge of enrollments, which seems like a happy misfortune.

IMAGE COURTESY OF WISCONSIN TECHNICAL COLLEGE SYSTEM

But the surge diverts attention from an underlying big, messy problem. Most CS university graduates are heading for the currently plentiful elite designer jobs, in which they will create and design new computing technology. There are a great many more unfilled technician jobs and more will be needed to support the infrastructure.

Who will operate and maintain the information infrastructure on which so much else depends? That is our worry. Universities say they are not preparing technicians; training is outside their scope. Technician jobs, which do not pay as well as the designer jobs, do not attract the university graduates. Community colleges and two-year colleges do not seem to have enough capacity to meet the need. There are few programs to transition workers displaced by digital automation into these digital technician jobs.

As our graduates find more and more clever ways to automate knowledge work, the number of displaced workers will rise. The displaced would readily take the IT technician jobs but the education system offers them few paths for retraining. To quote *The Economist* (Oct. 4, 2014): "Vast wealth

is being created without many workers; and for all but an elite few, work no longer guarantees a rising income."

Technician Shortage

To begin, we acknowledge there is controversy around whether there is a shortage of IT workers.[1] The whole market of IT jobs does not worry us; just the segment we call technicians.

The U.S. Labor Department defines IT technicians as those who diagnose computer problems, monitor computer processing systems, install software, and perform tests on computer equipment and programs. Technicians also set up computer equipment, schedule maintenance, perform repairs, and teach clients to use programs. Technicians need strong knowledge of computers and how they operate, including a broad understanding of hardware and software, operating systems, and basic computer programming. Many technicians must be familiar with electronic equipment, Internet applications, and security. Technicians may also need good communication skills because they interact frequently with people who have varying levels of IT knowledge.

The U.S. Labor Department reported in September 2014 that 16 million mid- and low-skill workers had been displaced by automation and would presumably become employed if they could be retrained. If those people and the underemployed (people with part-time jobs seeking full-time employment) were counted in the unemployment figures, U.S. unemployment rate would have been 11.8% rather than 5.9% in that September. Even retrained workers have had difficulty finding employment. One reason is that employers prefer people with specialized knowledge of their systems. Another is age discrimination—people in their 50s have a much more difficult time finding employment in IT companies than those in their 20s and 30s.

For perspective see the accompanying table, a map of the subdivisions of the computing field (adapted from the 2011 column[2]). The computing departments in the universities are, of course, focusing on the education in the computing core disciplines. Similarly other academic departments are focusing on the computational part of their fields. Who is focusing on the third column, the computing infrastructure technicians?

Professional subdivisions of the computing field.

Computing-Core Disciplines	Computing-Intensive Disciplines	Computing-Infrastructure Occupations
Artificial intelligence	Aerospace engineering	Computer technician
Cloud computing	Bioinformatics	Cyber operator
Computer science	Cognitive science	Database administrator
Computer engineering	Computational science	Help desk technician
Computational science	Digital library science	Network operator
Database engineering	E-commerce	Network technician
Computer graphics	Genetic engineering	Professional IT trainer
Cyber security	Information science	Security specialist
Human-computer interaction	Information systems	System administrator
Network engineering	Public policy and privacy	Web identity designer
Operating systems	Instructional design	Web programmer
Performance engineering	Knowledge engineering	Web services designer
Robotics	Management information systems	
Scientific computing	Network science	
Software architecture	Multimedia design	
Software engineering	Telecommunications	

Not the computing departments in four-year colleges. In fact, they call that form of education "training" and say they do not do training. They leave the "training" to two-year colleges, career academies, and a growing number of private firms that offer training certificates.

The Manpower Group (http://www.manpowergroup.com/talent-shortage-explorer) lists 10 jobs employers are having most difficulty in filling. The top ones globally include skilled trades, technicians, engineers, sales representatives, and IT staff. Many skilled tradespeople, engineers, and IT staff fit our definition of technician given in this column.

An example of a technician shortage can be seen in the cyber operator category. Cyber operators manage networks and provide for network security The U.S. Department of Defense has been looking for 6,000 cyber professionals since 2012. In 2014, they had filled 900 and still hoped to fill them all by 2016. Whether they can is an open question.[4]

The report "Job Growth and Education Requirements Through 2020" (http://cew.georgetown.edu/recovery2020) says that 66% of job openings by 2020 will be sub-bachelor. Most jobs will require some post-secondary education and will rely more on communication and analytic skills than on manual skills. Those with only a high school diploma will have fewer employment options. Education at the sub-bachelor level is very important and yet is not well funded. For example, The Brookings Institution in "The Hidden STEM Economy" (http://www.brookings.edu/research/reports/2013/06/10-stem-economy-rothwell) notes there are many sub-bachelor STEM jobs, but only one-fifth of U.S. federal spending allocated for STEM education goes to sub-bachelor education such as two-year colleges.

The huge and growing demand for providing training in computer coding to young people (code.org, codeacademy.org, khanacademy.org, coderdojo.org, girlwhocode.com and more) demonstrates that coding is a sub-bachelor STEM skill in high demand and that young people are eager to learn it. Coding is the basis of many technician skills in IT. We are also concerned the current surge of interest in coding should not become a dead end, but open a path to the full set of principles making up computing science.

Investments in Training and Continuing Education

Given the importance of finding qualified employees and keeping them from becoming obsolete, one would think that companies are investing in training of prospective employees and continuing education of on-board employees.

Yet there are worrisome reports that this principle is not widely accepted. An IBM division recently declared it would reduce salaries of employees by 10% for a six-month period while they were receiving training.[5] The training was needed to maintain their qualifications for their future jobs. For IBM, this is a sharp break from its own history of supporting education and professional development of its people. We understand that other IT industries are considering similar policies of "cost sharing" for required training. Such policies would be disastrous if they became widespread.

Another worrisome aspect is that many companies are not investing in R&D, equipment, and training, which all affect their long-term future. Many are plowing their cash into stock buybacks and some are going into debt to do so. *The Economist* (Sept. 13, 2014) said: "In 2013 38% of [U.S.] firms paid more in buy-backs than their cashflows could support, an unsustainable position. Some American multinationals with apparently healthy global balance sheets are, in fact, dangerously lopsided. They are borrowing heavily at home to pay for buy-backs while keeping cash abroad to avoid America's high corporate tax rate." *Financial Times* listed six major IT companies in the top 10 engaged in buy-backs. The policy climate is drawing companies into short-term decisions that do not align with their long-term interests.

Finding the Way Out

Education is the key to opening a path for people to move from a displaced position into a technician position that would give them productive work and a chance at rising pay, while easing joblessness and blunting the inequality between the IT elite and the rest of the workforce. Colleges and universities will not be of much help in the short run because they do not see themselves as part of the "training" side of education.

One promising means is a new kind of organization called Regional Talent Innovation Networks (RETAINs).[3] They are non-profit intermediaries that link K–12 schools, two-year colleges, community colleges, and workplace-based training and education.

Coding is the basis of many technician skills in IT.

Their goal is to produce well-educated STEM talent to support a technology-driven economy. Examples include High School, Inc. in Santa Ana, CA; the Vermillion Advantage in Danville, IL; the New North in northeastern Wisconsin; New Century Careers in Pittsburgh, PA; and the Steinbeck Cluster in Salinas, CA. There are more than 1,000 RETAINs across the U.S. and around the world.

RETAINs are particularly attractive to small business owners because they offer a viable way of pooling their resources in joint programs that will inform, attract, and prepare skilled workers for IT and other growing regional industries. RETAINs link regional employers, educational institutions, and other community organizations together as a collaborative network, thereby reducing the individual company's investment in employer-provided education and training. RETAINs promote a more positive overall regional business culture of sharing rather than stealing workers from each other. We think RETAINs will play a key role in the reeducation of workers displaced by digital automation.

Another promising means is the career academy. These high schools blend a stronger liberal arts curriculum with specific practical career education courses and internship experiences. Over 2,500 comprehensive career academies are already operating. Many are stand-alone learning communities within larger high schools. Some are stand-alone career high schools in health care, IT, and various STEM areas.

Because the demand for sub-bachelor skills is so obvious, private entrepreneurs have been starting businesses to provide inexpensive online training. The MOOC, which makes university-level courses widely available, has not yet tackled the technician shortage. The online competency based module (OCBM) is closer to the mark and a growing number of companies are offering them.[6] As these technologies mature, more people will be able to get online training and be certified in a new skill set. With support from their employers, workers can also use these technologies for their continuing education.

The MOOC and OCBM demonstrate that not even the education process is exempt from automation. Before long, students whose only current choice is to enroll in a university may choose instead to enroll in a two-year college or a private company that offers such training. This could displace university faculty by depleting the flow of students seeking enrollment in college. No one is immune from automation of their jobs anymore. C

References

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Information Technology
2008

Curriculum Guidelines for Undergraduate Degree Programs in Information Technology

Association for Computing Machinery (ACM)
IEEE Computer Society

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INFORMATION TECHNOLOGY (IT)

Prepared by Michael Soltys, August 20 Based on a write up of Peter Smith

PROGRAM OUTCOMES

Students graduating with a major in INFOMRATION TECHNOLOGY will be able to:

1	**Students should demonstrate critical thinking and prob and presenting fundamental software solutions and the**
2	**Students should demonstrate the knowledge of current industry and society, including a working knowledge of**
3	**Students should be cognizant of emerging new technol Computer industry;**
4	**Students should be cognizant of emerging new technol computer industry**
5	**Demonstrate communication, research and cooperation interdisciplinary group settings - both inside and outsid**
6	**Students should demonstrate a sense of exploration tha tech and bio-tech industries with life-learning.**

OBJECTIVE ID	COURSE	#		OBJECTIVE	Assessable?
IT 105- 1	IT	##	1	Be able to organize and express ITuter programming ideas clearly in oral and written form.	y
IT 105- 2	IT	##	2	Be able to implement simple ITuter programs.	y
IT 105- 3	IT	##	3	Be able to design simple algorithms.	y
IT 105- 4	IT	##	4	Be able to use simple data structures including arrays.	y
IT 105- 5	IT	##	5	Be able to implement simple ITuter program debugging techniques.	y

IT 105- 6	IT	##	6	Be able to understand concepts and issues in ITuting including ITuter terminology.	y
IT 105- 7	IT	##	7	Gain a broad appreciate of the foundations of ITuter science software and hardware as well as the effects of ITuting on society.	y
IT 151- 1	IT	##	1	Demonstrate the role of abstract data types and data structures.	y
IT 151- 2	IT	##	2	Describe the common container attributes of different data structures.	y
IT 151- 3	IT	##	3	Determine the time ITlexity of an algorithm.	y
IT 151- 4	IT	##	4	Discuss the time-space-trade-offs often required in algorithm design.	y
IT 151- 5	IT	##	5	Organize and express ideas clearly and convincingly in oral and written forms.	y
IT152-1	IT	##	1		
IT152-2	IT	##	2		
IT152-3	IT	##	3		
IT152-4	IT	##	4		
IT162-5	IT	##	5		
IT 221- 1	IT	##	1	Operate UNIX-based ITuter (such as Mac or Linux PC) using Command Line Interface (CLI).	y
IT 221- 2	IT	##	2	Edit text files using character-based editors such as vi, nano, and emacs.	y
IT 221- 3	IT	##	3	Interact with UNIX shells such as sh, bash, etc.	y
IT 221- 4	IT	##	4	Develop C programs that utilize all major programming techniques.	y
IT 221- 5	IT	##	5	Write programs that interact with UNIX and that can be used as UNIX utilities; i.e., they can be invoked from CLI as UNIX extensions.	y

IT 221- 6	IT	##	6	Organize programs in logical groups and ITile them in a systematic and synchronized manner using UNIX make facilities.	y
IT 380- 1	IT	##	1		
IT 380- 2	IT	##	2		
IT 380- 3	IT	##	3		
IT 380- 4	IT	##	4		
IT 400- 1	IT	##	1		
IT 400- 2	IT	##	2		
IT 400- 3	IT	##	3		
IT 400- 4	IT	##	4		
IT 400- 5	IT	##	5		
IT 401- 1	IT	##	1		
IT 401- 2	IT	##	2		
IT 401- 3	IT	##	3		
IT 401- 4	IT	##	4		
IT 401- 5	IT	##	5		
IT 402- 1	IT	##	1		
IT 402- 2	IT	##	2		
IT 402- 3	IT	##	3		
IT 402- 4	IT	##	4		
IT 402- 5	IT	##	5		
IT 403- 1	IT	##	1		
IT 403- 2	IT	##	2		
IT 403- 3	IT	##	3		
IT 403- 4	IT	##	4		
IT 403- 5	IT	##	5		
IT 420- 1	IT	##	1	Identify the ITonents of a database system.	y
IT 420- 2	IT	##	2	Represent information in the form of tables, records, and fields.	y
IT 420- 3	IT	##	3	Construct Entity Relation diagrams.	y
IT 420- 4	IT	##	4	Analyze and implement basic sql queries.	y
IT 420- 5	IT	##	5	Integrate a database with a programming language.	y

IT 420- 6	IT	##	6	Identify and represent system constraints.	y
IT 420- 7	IT	##	7	Organize and express ideas clearly and convincingly in oral and written forms.	y
IT 421- 1	IT	##	1	Discuss the philosophy of Unix Operating System.	y
IT 421- 2	IT	##	2	Control Unix using command line interface.	y
IT 421- 3	IT	##	3	Use regular expressions.	y
IT 421- 4	IT	##	4	Edit streams with sed and awk.	y
IT 421- 5	IT	##	5	Edit files with vi and emacs.	y
IT 421- 6	IT	##	6	Program scripts in Bourne Shell.	y
IT 421- 7	IT	##	7	Program in Perl.	y
IT 421- 8	IT	##	8	Develop applications using Unix development tools.	y
IT 421- 9	IT	##	9	Develop applications in C that control Unix-based systems through the use of system calls.	y
IT 424- 1	IT	##	1	Discuss and design modern security protocols.	y
IT 424- 2	IT	##	2	Assess vulnerabilities of ITuter systems and corresponding threats.	y
IT 424- 3	IT	##	3	Explain impediments to security.	y
IT 424- 4	IT	##	4	Assess the strength of a cryptographic system.	y
IT 424- 5	IT	##	5	Organize and express ideas clearly and convincingly in oral and written forms.	y
IT428-1	IT	##	1		
IT428-2	IT	##	2		
IT428-3	IT	##	3		
IT428-4	IT	##	4		
IT429-1	IT	##	1		
IT429-2	IT	##	2		
IT429-3	IT	##	3		
IT429-4	IT	##	4		

IT 464- 1	IT	##	1	Identify the ITonents of a ITuter graphics system.	y
IT 464- 2	IT	##	2	Analyze the Perspective Projection.	y
IT 464- 3	IT	##	3	Identify the advantages of a Raster Graphics system.	y
IT 464- 4	IT	##	4	Identify the advantages of a Vector Graphics system.	y
IT 464- 5	IT	##	5	Evaluate the trade offs between different graphic display systems.	y
IT 464- 6	IT	##	6	ITare and evaluate different ITutational methods of ITuter graphics.	y
IT 464- 7	IT	##	7	Organize and express ideas clearly and convincingly in oral and written forms.	y
IT466-1	IT	##	1		
IT466-2	IT	##	2		
IT466-3	IT	##	3		
IT466-4	IT	##	4		
IT466-5	IT	##	5		
IT 490- 1	IT	##	1	Identify new important developments in ITuter science.	y
IT 490- 2	IT	##	2	Discuss current needs in ITuter science and design modern software.	y
IT 490- 3	IT	##	3	Present current developments in ITuter science in written and oral forms.	y
IT 491- 1	IT	##	1	Set capstone goals and objectives.	y
IT 491- 2	IT	##	2	Recognize fields of study that are relevant to the problem at hand.	y
IT 491- 3	IT	##	3	Conduct a literature search to build a reading list necessary to approach a problem.	y
IT 491- 4	IT	##	4	Select approaches for problem resolution.	y
IT 491- 5	IT	##	5	Construct plans for resolving problems.	y
IT 491- 6	IT	##	6	Select collaborators for resolving problems.	y

IT 491- 7	IT	##	7	Organize and express ideas clearly and convincingly in written and oral forms.	y
IT492-1	IT	##	1	Work in an industrial or scientific setting involving ITuter information skills.	y
IT492-2	IT	##	2	Participate full product development cycle.	y
IT492-3	IT	##	3	Prepare presentations of their projects.	y
IT494-1	IT	##	1	Perform research in ITuter Science, software development and its applications.	y
IT494-2	IT	##	2	Present their research in oral and written forms.	y
IT 497- 1	IT	##	1	Perform independent research in ITuter Science and applications.	y
IT 497- 2	IT	##	2	Present their research in oral and written forms.	y
IT 499- 1	IT	##	1	Reflect on current issues in ITuter Science and its applications.	y
IT 499- 2	IT	##	2	Apply their knowledge of ITuter Science to current issues in the field.	y
IT 499- 3	IT	##	3	Present their research in oral form.	y

References

http://compsci.csuci.edu/degrees/bsit.htm (Computer Science Web Page)

http://bit.ly/1J97hVA (2015/16 Catalogue for IT course

lem solving skills by identifying, evaluating, analyzing
ir applications;

Computing practices and broad technology use in
software development techniques

ogies and industrial practices connected to the

ogies and industrial practices connected to the

skills by working effectively with others in
e the classroom.

at enables them to pursue a rewarding careers in high-

How?	Is outcome now being assessed??	Maps to Program #
Homework, lab projects, exams with rubrics.	y	1,4,5
Homework, lab projects, exams with rubrics.	y	1,2,4,5
Homework, lab projects, exams with rubrics.	y	1,2
Homework, lab projects, exams with rubrics.	y	1,2,3,4,5
Homework, lab projects, exams with rubrics.	y	1,2,3,4,5

Oral and written quizzes with rubrics.	y	2,3
Peer-evaluated oral presentation with rubrics.	y	3,4,5
Homework, lab projects, exams with rubrics.	y	1,2,3
Homework, lab projects, exams with rubrics.	y	1,2,3,4,5
Homework, lab projects, exams with rubrics.	y	1,2,3,5
Homework, lab projects, exams with rubrics.	y	1,2,3,5
Homework, lab projects, exams with rubrics.	y	1,4
Lab projects with rubrics.	y	1,2,3,4,5
Lab projects with rubrics.	y	1,2,3,4,5
Lab projects with rubrics.	y	1,2,3,4,5
Lab projects with rubrics.	y	1,2,3,4,5
Lab projects with rubrics.	y	1,2,3,4,5

Lab projects with rubrics.	y	1,4
Homework, project, exams with rubrics.	y	2,3
Project with rubrics.	y	1,2
Homework with rubrics.	y	1,2
Homework, project, exams with rubrics.	y	1,2
Homework, project, exams with rubrics.	y	1,2,5

Homework, project, exams with rubrics.	y	1,2
Discussion, homework, project with rubrics.	y	1,5
Homework, exams with rubrics.	y	1,3,5
Labs projects with rubrics.	y	1,2,3,5
Labs projects with rubrics.	y	1,2,3,5
Labs projects with rubrics.	y	1,2,3,5
Labs projects with rubrics.	y	1,2,3,5
Labs projects with rubrics.	y	1,2,3,5
Labs projects with rubrics.	y	1,2,3,5
Labs peer projects with rubrics.	y	1,2,3,4,5
Labs peer projects with rubrics.	y	1,2,3,4,5
Homework, exams with rubrics.	y	2,3,5
Homework, exams with rubrics.	y	1,2,3,5
Homework, exams with rubrics.	y	1,2,3,5
Homework, exams with rubrics.	y	1,2,3,5
Homework, exams with rubrics.	y	1,2,3,5

Homeworks, exams with rubrics.	y	2,3,5
Homeworks, exams with rubrics.	y	1
Homeworks, exams with rubrics.	y	1
Homeworks, exams with rubrics.	y	1
Homeworks, peer lab projects, exams with rubrics.	y	1,2,3,5
Homeworks, peer lab projects exams with rubrics.	y	1,2,3,4,5
Peer lab projects, exams with rubrics.	y	4,5
Contingent on topics.		
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