

Annual Departmental Plan Report

Program Information

Program/Department: Computer Information Systems / Computer Science
 Department Chair: Brady Chen
 Department Assessment Committee Contact: Brady Chen

*Please be as detailed as possible in your responses. We will use this information to fulfill our NEASC requirements and this report will help with your next Program Review or aid with your external accreditation. This file is to be kept in the department and an electronic file is due to the Director of Assessment by **May 31** each academic year.*

Program Learning Outcomes (PLOs) (Educational Objectives)

I. List all PLOs and the timeline for assessment.

(Note: The PLOs listed here are the CIS Student Outcomes from the ABET self-study document.)

PLO #	PLO – Stated in assessable terms.	Timing of assessment (annual, semester, bi-annual, etc.)	When was the last assessment of the PLO completed?
1.	Demonstrate proficiency in relevant aspects of mathematics and principles of CIS.	Every two years	Spring 2017
2.	Demonstrate business and systems programming skills.	Every two years	Spring 2017
3.	Demonstrate skills in management, accounting, and financial reporting.	Every two years	Spring 2017
4.	Demonstrate proficiency in the design and implementation of database systems.	Every two years	Spring 2017
5.	Demonstrate excellence in oral and written communication.	Every two years	Spring 2017
6.	Demonstrate proficiency in systems design and implementation methods.	Every two years	Spring 2017
7.	Demonstrate proficiency in data communications and networking.	Every two years	Spring 2017
8.	Demonstrate the ability to work in teams.	Every two years	Spring 2017

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9.	Demonstrate the ability to learn after leaving the university.	Every two years	Spring 2017
10.	Demonstrate understanding of the ethical, legal and social issues associated with computing.	Every two years	Spring 2017

II. PLO Assessment (Please report on the PLOs assessed and/or reviewed this year, programs should be assessing at least one each year.)

Using the table below, list and briefly describe the **direct method(s)** used to collect information assessing whether students are learning the core sets of knowledge (K), skills (S) and attitudes (A) identified as essential.

PLO #	Assessment description (exam, observation, national standardized exam, oral presentation with rubric, etc.)	When assessment was administered in student program (internship, 4 th year, 1 st year, etc.)	To which students were assessments administered (all, only a sample, etc.)	What is the target set for the PLO? (criteria for success)	Reflection on the results: How was the “loop closed”?
1-10	We assess the PLOs through the assessment of ten key courses. Table 1 shows the association between PLOs and the key courses.	See Table 2 for the assessment cycle	Due to small class sizes for CIS classes all the students are assessed.	See the fifth column “Target %tile scoring better than 70%” in Table 3 for the target set for PLO.	See last column “Action Taken” in Table 3

Ten key courses were used for assessment purposes. Instructors for the 10 key courses gather assessment data every other year according to the schedule shown in Table 2 below. This schedule provides a complete program assessment every two years based on 66 course objectives. Thus, since fall of 2013 we have completed two assessment cycles. Cycle 1 is from fall 2013 through Spring 2015 and cycle 2 is from Fall 2015 through Spring 2017. Table 3 shows the assessment data for cycle 2. Assessment tools align with course objectives and the number of objectives varies from 4 to 9 depending on the course. Student performance related to each objective is assessed by various tools embedded within each key course. The tools used to assess student learning of any given course objective may consist of quizzes (Q), exams (E), tests (T), homework (H), assignments (A), final exam questions (F), projects (P), lab exercises (L), group work (GW), mock consul (MC), final presentations (FP) or a combination of these. Student grades on each tool associated with each objective for each of the key courses are used to compute a score for each objective. A percentile rank of students (generally 80%) scoring above a particular threshold score (generally 70%) is used to identify areas requiring improvement. It is important to note that our class sizes are often small (24 maximum; many classes have enrollments less than 18). Smaller classes may have difficulty

meeting an 80 percentile criteria for every course objective especially in classes below the 3000-level where students may still be unsure about continuing with the computer information systems major.

Assessment occurs over a two year cycle. During this period 10 key courses contribute to the assessment. Two of these courses are offered in the Business Administration department. The key courses used for assessment are:

- BSAD 2010 Intro to Financial Reporting
- BSAD 2020 Intro to Managerial Accounting
- CSC 1400 Computer Information Systems
- CSC 1900 Discrete Math
- CSC 2560 Systems Programming
- CSC 2700 Business Programming
- CSC 3400 Data Communications and Networking
- CSC 3450 Local Area Networks
- CSC 3710 Systems Analysis Methods
- CSC 4700 Systems Design and Implementation

In the current assessment cycle, the following course will be added to address the weakness in PLO #10 in the last ABET report.

- CSC 4102 Ethical Issues in Computer Science

Table 1. The key courses used for assessment

CIS Student Outcomes	Courses used to assess student outcomes										
	C1400	C2560	C2700	C3400	C3450	B2010	B2020	C3710	C4700	C1900	C4102
1 - Proficiency in Math and CIS principles.	X									X	
2 - Business and systems programming skills.		X	X								
3 - Management, accounting, and financial reporting.						X	X				
4 - Design and implementation of database systems.									X		
5 - Excellence in oral and written communication.									X		
6 - Systems design and implementation methods.								X	X		
7 - Data communications and networking skills.				X	X						
8 - Teamwork								X	X		
9 - Lifelong learning								X	X		

Fall 2015- Spring 2017	How Measured			Target %tile scoring better than 70%	Actual %tile	Action taken
Performance Indicators (Course Objectives)	Term	Course	Tool			
Information Systems in business	Fall1	C1400	H1; T1	80%	100%	
Computer hardware and software	Fall1	C1400	H3; T2; P1	80%	93%	
Networks and data communications	Fall1	C1400	H3; T1, 2	80%	100%	
Data management	Fall1	C1400	H7, F	80%	60%	Add more hours and develop practice test
Problem solving in business environment	Fall1	C1400	H6, 7, 9; F	80%	60%	
Business management decision making	Fall1	C1400	H6, F	80%	60%	
E-Commerce	Fall1	C1400	H4, T2	80%	80%	
IS and IT development	Fall1	C1400	H2, 9; T1; F	80%	73%	Add more hours
Describe the systems development life cycle and specific life cycle models	Fall1	C3710	E1	80%	100%	
Describe systems analysis and the role of the systems analysis	Fall1	C3710	E1	80%	100%	
Describe how information systems projects are proposed and initiated	Fall1	C3710	E1; P2	80%	100%	
Develop basic systems doc incl project charters, sys proposals, req questionnaires, prototypes,	Fall1	C3710	E1; P1, 2, 3, 4	80%	100%	

Fall 2015- Spring 2017	How Measured			Target %tile scoring better than 70%	Actual %tile	Action taken
Performance Indicators (Course Objectives)	Term	Course	Tool			
event rsp tables, and context level diagrams						
Analyze, model, and specify a system’s process and data requirements	Fall1	C3710	P3; E2	80%	100%	
Compare and contrast structured and object oriented development	Fall1	C3710	E1	80%	100%	
Discuss emerging trends and issues in systems analysis	Fall1	C3710	A	80%	100%	
Work cooperatively in a group to integrate the concepts learned	Fall1	C3710	GW	80%	67%	This is due to the small class size. 2 students got low grades and one student didn’t submit the work.
Construct and present effective oral and written forms of professional communications	Fall1	C3710	PP	80%	92%	
Structured programming techniques	Sp1	C2700	Q1	80%	94%	
Data, record and file design	Sp1	C2700	Q1	80%	94%	
Sorting and merging of files	Sp1	C2700	Q4	80%	81%	
Table handling	Sp1	C2700	Q3	80%	88%	
Variable length records	Sp1	C2700	Q3	80%	88%	
Sequential access methods	Sp1	C2700	Q4	80%	81%	

Fall 2015- Spring 2017	How Measured			Target %tile scoring better than 70%	Actual %tile	Action taken
Performance Indicators (Course Objectives)	Term	Course	Tool			
File creation, update and report	Sp1	C2700	Q4	80%	81%	
Use tools and describe steps required to design and implement good business system	Sp1	C4700	P2, 3	70%	100%	
Analyze good versus bad output and input designs	Sp1	C4700	E1; P2, 3; MC1, 2	70%	100%	
Describe general guidelines for designing websites and mobile apps, incl DBs	Sp1	C4700	E2; P4; MC3	70%	90%	
Eval diff implement options and desc appr for dev of implement plans, incl test, train, roll-out, sec & priv, and dis recov	Sp1	C4700	E2; P4; MC5	70%	90%	
Discuss emerging trends and issues in systems design and implementation	Sp1	C4700	A	70%	90%	
Work cooperatively in a group to integrate the concepts learned	Sp1	C4700	GW	70%	70%	
Construct and present effective oral and written forms of professional communications	Sp1	C4700	FP	80%	100%	
Structured programming with C	Fall2	C2560	A1;T1	80%	73%	Develop Handout

Fall 2015- Spring 2017	How Measured			Target %tile scoring better than 70%	Actual %tile	Action taken
Performance Indicators (Course Objectives)	Term	Course	Tool			
Dynamic arrays and linked lists	Fall2	C2560	A3;T2;F	80%	90%	
Trees and pointer arithmetic	Fall2	C2560	A2;T2;F	80%	73%	Develop Practice test
Pass by value versus pass by reference	Fall2	C2560	A2;T3;F	80%	100%	
File manipulation and IO methods	Fall2	C2560	A4	80%	90%	
Problem Analysis and Design	Fall2	C2560	A2-4;F	80%	100%	
UNIX systems and programming	Fall2	C2560	T4	80%	90%	
Ethics in financial reporting	Fall3	B2010	E1;F	75%	80%	*actual numbers are class means (not percentile)
Transactions: debits & credits	Fall3	B2010	E1;F	75%	80%	
GAAP - revenue recognition	Fall3	B2010	E1;F	75%	80%	
Inventory costing methods	Fall3	B2010	E2	75%	72%	
Bank reconciliation	Fall3	B2010	E2	75%	72%	
Valuation of accounts receivable	Fall3	B2010	E2	75%	72%	
Data conversion and signaling	Fall2	C3400	E1	80%	75%	
Media types and tradeoffs	Fall2	C3400	E1;E2	80%	75%	
Modem types and operations	Fall2	C3400	E2	80%	67%	
Synchronous and async communications	Fall2	C3400	E2	80%	67%	

Fall 2015- Spring 2017	How Measured			Target %tile scoring better than 70%	Actual %tile	Action taken
Performance Indicators (Course Objectives)	Term	Course	Tool			
Multiplexing techniques	Fall2	C3400	E2	80%	67%	
Error causes, detection and control	Fall2	C3400		80%		Retiring Faculty Member did not retain all materials
Protocols and components	Fall2	C3400		80%		
WAN routing and switching types	Fall2	C3400		80%		
The Internet and protocols used	Fall2	C3400		80%		
Boolean expressions and Truth tables	Sp2	C1900	T1;F	80%	87%	
Proof techniques	Sp2	C1900	T2;F	80%	94%	
Boolean techniques in digital electronics	Sp2	C1900	T3;F	80%	87%	
Basic Set theory	Sp2	C1900	T4;F	80%	100%	
Basic Number theory	Sp2	C1900	T5;F	80%	81%	
Basic counting principles	Sp2	C1900	T6;F	80%	100%	
Graphs and trees	Sp2	C1900	T7;F	80%	95%	
Basic Computational theory	Sp2	C1900	T8;F	80%	100%	
Job order costs versus process costs	Fall3	B2020	E1	75%	75%	*actual numbers are class means (not percentile)
Cost behavior and cost volume profit	Fall3	B2020	E2	75%	82%	
Margin analysis, static and flexible budgets	Fall3	B2020	F;P	75%	83%	
Costing methods and product pricing	Fall3	B2020	E2	75%	82%	
Server Installation	Sp2	C3450	L1; P1; F	80%	75%	

Fall 2015- Spring 2017	How Measured			Target %tile scoring better than 70%	Actual %tile	Action taken
Performance Indicators (Course Objectives)	Term	Course	Tool			
Server Configuration and Backup	Sp2	C3450	L2; P1; F	80%	75%	
Accounts and Client Connectivity	Sp2	C3450	L3; P1; F	80%	75%	
Security	Sp2	C3450	L4; P2; F	80%	100%	New instructor for cycle 2.
File Systems and Disk Quotas	Sp2	C3450	L5; P2; F	80%	83%	
LAN Configuration and Protocols	Sp2	C3450	L6; P2; F	80%	100%	
Server Monitoring and Optimization			L7; P2; F		100%	
Network Planning and Monitoring			L8; F		75%	

III. Summary of Findings: Briefly summarize the results of the PLO assessments reported in Section II above combined with other relevant evidence gathered and show how these are being reviewed/discussed. How are you “closing the loop”?

Other than GPA, what data/evidence is used to determine that graduates have achieved the stated outcomes for the degree? (e.g., capstone course, portfolio review, licensure examination)	Who interprets the evidence? What is the process? (e.g. annually by the curriculum committee)	What changes have been made as a result of using the data/evidence? (close the loop)
The performance indicators (course objectives) of the 10 key courses are used to determine that graduates have achieved the stated outcomes and thus the PLOs.	Each instructor of the key courses presents and interprets the evidence in the curriculum meetings and the department curriculum committee discusses and makes recommendation on what changes/actions the instructor needs to be taken.	See the last column “Action Taken” in Table 3

Assessment Plan for Program/Department

I. Insert the program or department Assessment Plan

Since our last report from the ABET Computing Accreditation Commission in 2016, we have been following our assessment process and adapting a program-wide embedded assessment model. The assessment tools and targets are set by the individual instructors based on course objectives, course level, course complexity and previous assessment results. Each course outline listed in the “Course Syllabi” section (Appendix A) contains a table showing how each course objective aligns with program student outcomes. The student outcomes are mapped to program educational objectives as given in the table under Criterion 3 section A.

For assessing courses in our department we use a percentile above a threshold grade. This measure tells us the proportion of students meeting the threshold criteria and gives an indication of how well the student population performs with respect to each course objective (currently 80% or 70% depending on course). Courses in the Business Administration Department are assessed differently according to their department policy.

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II. Explain any changes in the assessment plan including new or revised PLOs, new assessments that the program/department plans to implement and new targets or goals set for student success.

The PLOs are expected to be changed in our next ABET accreditation in 2019 due to the change of new ABET criteria.

III. If you do not have a plan, would you like help in developing one?

Yes

University Data

I. SSC Data

Indicate **at least one** Student Success Performance Measure that the department/program has identified for planned change or improvement.

Freshman retention, bottleneck courses, graduation rates, at risk student retention etc.

The most recent SSC data was in 2010. For the past years, we have found out that more incoming students are less prepared for CS and CIS majors due to the unreadiness of mathematics and general science knowledge. So, we revised many our courses including CSC1500 and CSC1550 courses several years ago. We have included Python programming language in CSC1500. Therefore more recent SSC data are expected.

In the meantime, the department has been focusing on the recruitment by creating new concentrations for the past years: game programming concentration for CS major, cybersecurity concentration for CIS. Low retention rates are always the problem for CS and CIS majors due to the extensive requirements for programming, mathematics, and hardware (for CS) courses.

a. What was the focus this year?

Student Success Measure (data point from SSC)	Implemented Intervention	Update on Implemented Intervention (i.e. change in target, satisfied with outcome, not satisfied, will continue or not)

b. What will your focus be for the upcoming year?*

Student Success Measure (data point from SSC)	Rationale for selection	Planned or Implemented Intervention	Current score/ Target Score	This measure was selected because of last Program Review or Accreditation (yes/no)
Freshman retention	The majority of CS/CIS students switch their majors after they fail CSC1500 and math courses in their freshman year.	We have no planned or implemented intervention yet. We plan to discuss this in the forthcoming semester.	N/A	No

*Note: Programs may wish to monitor or review the same data point over multiple years.

II. Trend Data

Indicate **at least one** Department Performance Measure that the program/department identified for change or improvement. Number of graduates, number of majors, credit production, substitutions etc.

a. What was the focus this year?

Department Performance Measure (data point from Trend Data)	Implemented Intervention	Update on Implemented Intervention (i.e. change in target, satisfied with outcome, not satisfied, will continue or not)

b. What will be the focus next year?*

Department Performance Measure (data point from Trend Data)	Rationale for selection	Planned or Implemented Intervention	Current score/ Target Score	This measure was selected because of last Program Review or

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				Accreditation (yes/no)

*Note: Programs may wish to monitor or review the same data point over multiple years.

Program Review Action Plan or External Accreditation Action Letter/Report

Annual Reflection/Follow-up on Action Plan from last Program Review or external accreditation (only complete the table that is appropriate for your program)

I. Programs that fall under Program Review:

- i. Date of most recent Review:
October, 2013
- ii. Insert the Action Plan table from your last Program Review and give any progress towards completing the tasks or achieving targets set forth in the plan.

Specific area where improvement is needed	Evidence to support the recommended change	Person(s) responsible for implementing the change	Timeline for implementation	Resources needed	Assessment Plan	Progress Made this Year
<p>Program deficiency: no faculty members who hold a terminal degree in information systems</p>	<p>Action 1: Hired Dr. Ricky Sethi who has Ph.D. in CS and master degree in IS. ABET reevaluated the case and deficiency remained. Action 2: Appointed Dr. Audrey Pereira (who has Ph.D in CIS) and Dr. Michael Greenwood (who specialized in</p>	<p>Paul Weizer, Brady Chen, Joseph McAloon</p>	<p>Action 1: October 2013 – October 2014 Action 2: December 2015 - May 31, 2016</p>	<p>Hire new faculty</p>	<p>N/A</p>	<p>Submit the planned changes to ABET.</p>

	Management) as CIS faculty.					
Program weakness: lack of coverage in professional, ethical, legal, security, and social issues and responsibilities.	Action 1: Correction in the self-study Action 2: Additional information not included in the self-study. Action 3: Creation of one credit hour course CSC4002 Ethical Issues in Computer Science.	Brady Chen, Nadimpalli Mahadev, Kevin Austin, CS department curriculum committee	October 2013 – October 2014	Need a faculty to teach the class	Assessment for CSC4002 in Spring 2015	Submit the planned changes to ABET.
Program Concern: Faculty members have too much teaching load	Action 1: Re-organization of scheduling of graduate courses. no faculty member needed to take on more than one graduate class each semester in addition to their day load. Action 2: New hiring. We hired Dr. Ricky	CS department curriculum committee	October 2013 – October 2014	Hire new adjunct faculty to cover some day and evening courses	N/A	Submit the planned changes to ABET.

	Sethi who has Ph.D. in CS and master degree in IS.					
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See the following attached documents for details:

1. Response to the ABET Final Statement
 2. Response to the December 11, 2015 ABET Draft Statement Regarding the Fitchburg State University Computer Information Systems Program
- iii. If you do not have an action plan, would you like help in developing one based on your last program review and needs of the program?
- Yes

II. Programs with external Accreditation:

- i. Accreditor: ABET Computing Accreditation Commission
- ii. Date of last review: October 2013
- iii. Date of next review and type of review: October 2019
- iv. List key performance indicators:

List key issues for continuing accreditation identified in accreditation action letter or report.	Key performance indicators as required by agency or selected by program (licensure, board or bar pass rates; employment rates, etc.)(If required.)	Update on fulfilling the action letter/report or on meeting the key performance indicators.
Faculty is expected to be the main issue. ABET believes that we have no enough faculty to support Computer Science, Computer Information Systems, and Master of Computer Science programs.	N/A	N/A

UARC Peer Review of the Program Annual Report

Program: _____ Date of Review: _____

Program Learning Outcomes (PLOs)					
Criterion	Highly Developed (3)	Developed (2)	Emerging (1)	Initial (0)	Score
<i>Program Learning Outcomes (PLOs)</i>	All or almost all PLOs clearly stated and measurable.	Most of the PLOs clearly stated and measurable.	PLOs written in general, broad or abstract statements OR are not measurable.	PLOs not provided.	
<i>Expected Timing of Assessment</i>	All or almost all PLOs have a timeline stated.	Most PLOs have a timeline stated.	Very few PLOs have a stated timeline.	No timelines are given or are To Be Determined (TBD).	
<i>Assessment Tool Quality</i>	Assessment tool(s) is/are strong: very good quality and appropriate.	Assessment tool(s) are acceptable: good quality and appropriate	Assessment tool(s) are a good start but could use some strengthening or changes.	Assessment tool(s) are either not appropriate or not discussed.	
<i>PLO Assessment</i>	More than one PLO assessed and information is complete in the chart.	At least one PLO assessed and information is complete in chart.	At least one PLO assessed, information is not complete in chart.	No assessments completed during the academic year reported.	
<i>Criteria for Success</i>	The criteria for student success of each PLO is clearly stated and is appropriate.	Most criteria for student success of each PLO is clearly stated and is appropriate.	Criteria for student success discussed or touched upon but not clearly stated or is not appropriate.	Criteria for student success not provided.	
<i>Summary of Findings</i>	Measures used in from PLO assessment fully incorporated with additional	Very limited use of data from PLO assessment incorporated with	Used evidence other than PLO assessment to	No summary utilizing	

	evidence to formulate the summary and analysis supports the summary.	additional evidence to formulate the summary and analysis somewhat supports summary.	formulate the summary or analysis of the data doesn't seem to support summary.	assessment data is evident.	
Assessment Plan for Program/Department					
Criterion	Highly Developed (3)	Developed (2)	Emerging (1)	Initial (0)	Score
<i>Department or Program Assessment Plan</i>	Assessment Plan provided. Has clearly stated process with reasonable expectations.	Assessment Plan provided. Has somewhat clear process and/or somewhat reasonable expectations.	Assessment Plan provided, the process is not clear and/or the expectations are not reasonable.	No Assessment Plan provided.	
<i>Activities and Adjustments to/Deviation from the Department/Program Assessment Plan</i>	Decision to change or not change the assessment plan are clearly stated and decision(s) are appropriate based on the reported results.	Decision to change or not change the assessment plan are described in general terms and may be appropriate based on the reported results.	Decision to change or not change the assessment plan are vague and lack clarity.	No changes are discussed.	
University Data					
Criterion	Highly Developed (3)	Developed (2)	Emerging (1)	Initial (0)	Score
<i>SSC Data for Current Review Period</i>	Intervention undertaken by program/department for at least one SSC data point. Clearly documented results.	Intervention undertaken by program/department for at least one SSC data point. Plan not fully implemented.	Planned intervention by program/department for at least one SSC data point. No plan implemented.	No SSC data analyzed and/or reported on.	
<i>SSC Data for Upcoming Review Period</i>	At least one component of the SSC data selected to assess, rationale provided, targets set and intervention	At least one component of the SSC selected to assessed, some of the rationale provided,	SSC data discussed and some or part of the assessment, targets or	No SSC data analyzed and/or reported on.	

	seems to be appropriate based on information provided.	targets set and intervention seems to be appropriate based on information provided.	interventions are emerging but not fully appropriate.		
<i>Trend Data for Current Review Period</i>	Intervention undertaken by program/department for at least one Trend data point. Clearly documented results.	Intervention undertaken by program/department for at least one Trend data point. Plan not fully implemented.	Planned intervention by program/department for at least one Trend data point. No plan implemented.	No Trend data analyzed and/or reported on.	
<i>Trend Data for Upcoming Review Period</i>	At least one component of the Trend data selected to assess, rationale provided, targets set and intervention seems to be appropriate based on information provided.	At least one component of the Trend selected to assessed, some of the rationale provided, targets set and intervention seems to be appropriate based on information provided.	Trend data discussed and some or part of the assessment, targets or interventions are emerging but not fully appropriate.	No Trend data analyzed and/or reported on.	
Action Plane or External Accreditation Action Letter/Report					
Criterion	Highly Developed (3)	Developed (2)	Emerging (1)	Initial (0)	Score
<i>Only for those under Program Review Annual Reflection on Program Review</i>	Full Action Plan provided with definitive on-going progress clearly stated.	Full Action Plan provided with some discussion of on-going progress plans stated.	Full Action Plan provided with vague ideas regarding on-going progress plans stated.	Action Plan is either not provided or there no progress or plans stated for progress discussed.	
<i>Only for those under External Accreditation</i>	Key issues and performance standards provided with definitive on-going progress clearly stated.	Key issues and performance standards provided with some discussion of on-going progress stated.	Key issues and performance standards provided with vague ideas regarding on-going	Key issues and/or performance standards are either not provided or there	

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<i>Annual Reflection on Report/Letter from accrediting body.</i>			progress plans stated.	has been no progress or plans stated for progress.	
Comments:					

NOTE: This rubric is NOT an evaluation of the program/department. It is simply a tool for UARC to use as an aid in reviewing and providing constructive feedback to each program.