AGENDA

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Location: 2325 Murphy

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1) **Project Overview**

Questions:

a) *What is the approach and how was it selected?*
   i) *How does your approach compare with other universities?*

In early 1997 the serious limitations of the current Degree Audit System had initiated an effort to fully identify and document all degree audit needs campus wide. This effort resulted in the formation of the UCLA Degree Audit System Needs Analysis Committee led by Robert Kilgore, Associate Director of Operations for College Information Services. In mid-1998 the review committee issued the following warning in the summary of its final report submitted to Brian Copenhaver, then Provost of the College:

> UCLA’s degree audit system (DAUD) must be replaced/modified within the next 24-36 months….Failure to do so would have a devastating impact on the undergraduate population and on the operations of the many support offices which have come to depend on the automated system. (See Appendix A)

The scope of the committee’s investigation had included a full needs assessment, a review of commercially available audit systems, a preliminary investigation of degree audit systems in use at other UC campuses and a recommendation to meet the identified needs. After reviewing the merits of the three commercial available systems identified as the most “appropriate to the UCLA computing environment,” the committee concluded that the Degree Audit Reporting System (DARS) developed at Miami University (a market leader with several times the installed user base of all the other systems combined) was the “best of the systems we have reviewed.” Nevertheless, the committee’s consensus was that no vendor offered a system that was both suitably mature and capable of providing the range of functionality (including system and resource support) required to meet UCLA’s current and anticipated degree audit needs. Consequently, the committee suggested that the development of a new system be initiated in-house as a replacement to the current system.

In Fall 2000 renewed interest in part driven by the introduction of minors and other requirement changes outside the scope of analysis of the current system lead to the formation of another committee. Led by Eric Splaver, Director of College Information Services, this committee was charged with expanding the scope of the previous investigation by examining the audit strategies of other universities both in and out of the UC system, reviewing the progress of commercial vendors and coming to a final recommendation on a direction for UCLA.
The review of degree audit strategies employed by other universities revealed that most queried institutions were predominantly using DARS, with a few using other commercial products (Peoplesoft, On Course, Degree Navigator) and the rest relying on the development of home grown systems. The general consensus was that progress was generally very slow. The results of the vendor review also indicated a consolidation of products with an ever increasing user base opting to purchase DARS. It became evident that a visit to Miami University was appropriate.

In the two years since the previous review the DARS team at Miami University had developed a new client/server version of DARS to be called DARWin. The migration off of the mainframe combined with the inherit advantages of separating client from server made DARWin an appropriate component for part of a UCLA Audit solution.

DARWin’s shortcomings included its audit report, which was vastly inferior to the current system’s printed Degree Progress Report (DPR), and the complexity of its proprietary encoding language. On the positive side was the inclusion of a fully featured transfer articulation module, lower purchase and maintenance costs than a mainframe solution, the availability of an existing community of experts from whom encoders could be hired and from whom assistance could be received, ongoing enhancements to service the needs of an ever growing list of clients (attached as Appendix B), and the provision of encoding and implementation training at the Miami University campus.

A design plan was developed that would leverage the DARWin server as an audit engine while relying on in-house developed web-based modules to integrate with existing systems. This solution would make the submittal of information into and out of the system intuitive and efficient and allow degree audit information to be delivered via a web-service in XML. This XML stream would be made available to authorized requestors who could then format the audit information to be displayed in a manner consistent with their respective design and goals. The problem of encoding complexity will be mitigated by utilizing a central encoding office which can utilize an economy of scale to avoid the necessity for smaller units to hire their own specialized encoders.

Although our proof-of-concept was completed utilizing a UNIX-based server in conjunction with an Oracle database, recent developments at Miami University have presented us with the option of running the DARWin server on Microsoft Windows utilizing Microsoft SQL Server. Adopting this solution would result in the following benefits:
Periodic Comprehensive Review of the Degree Audit Replacement System

- less of an expenditure on hardware
- the option of using server clustering to achieve a higher level of scalability
- the chance for College Information Services development to leverage existing strengths and experience and reuse tools

We are currently watching closely the implementation of a similar system at Ohio State University and conducting tests of the Windows/SQL server environment in the hopes that we will find sufficient support for a decision to switch from AIX/Oracle to Windows/SQL before development begins.

b) **What are the phases for the project?**

Like most complex technology projects this project includes:

- a design phase
- a development phase
- a test and train phase
- an implementation phase
- and a maintenance phase

The design phase is the most important since a poor design will doom the project to failure leaving few alternatives to total replacement whereas a strong design will form a foundation upon which changing demands can be met. The following are critical design milestones:

- determine an overall system strategy
- determine the production environment
- ensure affected processes remain functional
- for each interface or system component
  - determine necessary functionality
  - determine component strategy
  - determine user interface format(s)

A strong design clarifies the steps leading to a successful development process. Such a process includes the following critical development milestones:

- encode degree requirements and transfer articulation logic
- for each interface or system component
  - determine object architecture
  - determine DARS data model dependencies
  - write functional code
  - create the user interface
Having completed the development phase the resulting system must be tested and necessary user training begun. This testing phase includes the following critical milestones:

- develop test plans and procedures
- execute these tests assessing system performance
- seek stakeholder approval of test results performing bug fixes and/or additional development as necessary to achieve the success

Having received stakeholder approval of test results the system would be ready for implementation. This implementation phase includes the following critical milestones:

- Configure the system in the production environment
- Tune as necessary in production environment

Once the system is running smoothly and providing service in the production environment the development team can celebrate. This celebration can’t last long as the maintenance phase begins immediately and includes the following critical tasks which are not milestones as they will require perpetual attention:

- maintain and encode additional degree and transfer articulation requirements
- develop additional functionality to support changing demands
- maintain hardware appropriately scaling support for demand
- upgrading software to maintain current interoperability

**c) When will the campus see benefit (have something useful) from the project?**

**i) In what form will the deliverables be?**

The new system is managed by a PowerBuilder application and a set of web interfaces. The PowerBuilder application is part of the back-end DARWin package and is used to configure the encoding information necessary to describe transfer articulation and degree requirements. This application will be used exclusively by encoding personnel in the UARS and CIS offices. The web interfaces will be used by departmental counselors to enter substitutions and exemptions, UARS staff to enter “source” data and to manually adjust individual transfer articulations, and various student service providers to view specialized audit reports (such as degree clerks, academic counselors, and departmental counselors.).

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1 Source information: transcript information using the transfer school’s names, grades, and unit values.
Access to audit information will be available to students through a variety of appropriate web sites (URSA, MyUCLA and others). Audit data will be delivered via a secured web service in an XML stream. Since XML is not specific to any one platform, it can be easily adapted to format degree audit information in a way that most closely approximates the look and feel of the website through which it is delivered.

Student service providers will also be able to see individual student audits via the Counselor Desktop web application maintained by College Information Services and used by counselors in the College of Letters & Science, the School of Arts & Architecture, the School of Theater, Film & Television and various administrative offices.

ii) **What are the expected timeframes?**

Implementation is scheduled for completion in time to provide auditing services to new winter 2005 freshman and transfer admits. New students in the College of Letters & Science, School of Theater, Film and Television and School of Arts and Architecture will use our new Degree Audit System for complete academic audits while continuing students will continue to use the current system. Additionally beginning winter 2005 all undergraduates regardless of School/College will have their transfer articulations processed by the new system and displayed on the OASIS: Transfer Credit screens.

Winter 2005 was chosen by consensus of the stakeholders because of restrictions on the availability of key staff members, an expectation of work completed, and because there are few winter admits. Moreover, the office of Student Affairs has a best practice of implementing large scale student systems during winter quarter so that any unexpected results have a mitigated effect. Finally, a fall implementation would have required completion by the end of the previous spring quarter in order to meet Orientation Program needs.

d) **Have there been any completed deliverables for the campus yet?**

i) **What was learned from the pilot?**

In December of 2002 the Proof-of-Concept (PoC) for this project was successfully completed. In the process of producing the deliverables described below we learned many valuable lessons about both the encoding process for the new degree audit system as well as its system architecture.

**Encoding requirements**

One of the key components of this project is the encoding of transfer articulation. During the PoC, both Santa Monica College (the biggest community college feeder school), and California State Northridge (an
important four year transfer institution), were encoded. Deliverables included more than just the encoding itself (no small accomplishment), however, as we learned through our own experience the level of complexity involved in the encoding of articulation logic. Armed with this information, we were able to assess the amount of work that would be required for a full-time articulation encoder to encode all transfer articulation logic and to maintain that logic for undergraduate transfer articulation.

Included in the PoC was the encoding of nearly all support tables, the Psychology Major and the new General Education requirements for the College. The production of these deliverables gave us a valuable headstart on encoding the degree requirements for the College of Letters & Science, the School of Arts & Architecture and the School of Theater, Film and Television. In addition, the experience has provided a means to estimate that two full time degree encoders will be necessary on a permanent basis to encode all degree requirements for the College and these two Schools. Finally, our increased knowledge of how to efficiently use some of the basic support tables will prove invaluable when we begin to incorporate the schools governed by other grading rules (such as the School of Law) into the system.

**System Architecture**

In addition to encoding, we purchased, installed, configured, tuned, and implemented the server infrastructure to provide full degree checking using DARWin. The complex steps involved in this process provided several opportunities to learn more about the underlying software architecture as well as the interaction between server components. Since that initial installation we have upgraded the DARWin server software and the process has become second nature.

Finally, we successfully connected the Degree Audit Server to the mainframe using a COBOL stub built into the DARWin server code through CICS over SNA. The completion of this task represented more than a technical achievement as it also demonstrated the ability of AIS and CIS to work together successfully.

2) **Functional Scope**

Questions:

a) *What functionality is included in the project?*

The project objectives include providing transfer articulation service to the majority of all undergraduates entering UCLA in winter 2005 (and thereafter) by applying coded articulation logic to source transcripts. Those few students attending schools for which no articulation logic has been stored will be articulated manually so that all undergraduate students entering winter 2005 (or thereafter) will be articulated by the same system.
Another objective is to offer complete degree requirement audits to students entering UCLA in winter 2005 (and thereafter) who are seeking undergraduate degrees in the College of Letters & Science, the School of Arts and Architecture and the School of Theater, Film and Television. In addition to degree audits of existing university, school, college and major requirements, students and their advisors will be able to use the degree audit system to investigate the implications of changing majors, adding minors etc.

The new system will provide an XML stream to a variety of web sites including URSA and MyUCLA so that students, staff, and Faculty Advisors can use an interactive, fully featured, web-based interface to see Degree Progress information online. It will also provide the means to request immediate ad hoc printable reports as well as to support the printing of small batch requests on an overnight basis.

Departmental advisors will have customized web interfaces to enter the vast majority of substitutions and exemptions. Other substitutions and exemptions will be entered centrally by CIS staff.

b) What functionality is not included in the current project but could be included in a future extension of the project?

i) Is the chosen platform and architecture able to handle this added functionality?

The current project is budgeted to include the encoding of Undergraduate College, School of the Arts & Architecture and School of Theater, Film and Television requirements only. It does not include the budget for encoding Grad Division, School of Engineering, School of Law, School of Management or any other School on campus. Because the funding is not included the encoding of those other Schools is not included in this project.

The architecture is based on a modular back-end processing strategy which will support the encoding of other Schools requirements including differing schedules such as quarter versus semester, differing grading schemas, and different unit allocation strategies. Additionally changes to web based interfaces to support additional types of requirements should pose no technical problems though additional funding may be necessary beyond that required for the back-end encoding of requirements.

The College has proposed the development of a “Student Plan” in which College undergraduates would identify enrollment preferences for future quarters. Using a carrot rather than a stick approach, students participating in this plan would earn preferential enrollment or sought after internships. By using statistical tools to scale the enrollment choices very reliable planning
information could be extracted and used to inform the Departmental class planning process. Tools to do so have been identified as critically needed. Although the “Student Plan” and subsequent class planning system will not be implemented as part of this project, both are currently being planned as future enhancements to the new degree audit system.

The School of Medicine and School of Dentistry currently maintain their own student data outside of the central campus student records system. Consequently neither school is planned for inclusion in this project. In order to enhancement would necessitate that local custodianship be turned over to the central student record system.

On occasion other schools have had specific requirements based on data kept under local custodial control although general enrollment information may be stored centrally. Any such requirements will be considered outside the scope of this project. Future enhancements to the system will support this type of external data but additional effort and cost are likely to be necessary for such support.

c) Does the Degree Audit project, currently underway and funded, continue to be an essential and wise course for the campus?

i) How will its success be measured?

A fully functional Degree Audit system is a fundamental campus-wide tool enabling many critical functions. It is the definitive academic advising tool used by students to understand their progress to degree, choose their classes, and assess the wisdom of pursuing additional or alternative degree programs. Academic advisors (from peer counselors to Professional Counselors to Faculty advisors) depend on the Degree Audit System to do the critical analysis necessary to provide students with an accurate assessment of their progress to degree—particularly since the time it would take to perform this type of detailed analysis by hand would exceed the total time advisors have available to meet with individual students. In good financial times the DAUD system both saves money and provides additional (and welcome) functionality for students and advisors alike; in difficult financial times, however, when the number of professional advisors is inexorably shrinking, the system plays a critical role.

The current system has been failing for several years. It is not capable of analyzing an increasing number of popular degree options. For example, it is not capable of analyzing the new General Education requirements which effects over 90% of current undergraduates and is planned for implementation campus wide.
Success of a new Degree Audit system can be measured in many ways. Fundamentally a new system needs to be able to automate the analysis of all degree requirements. It should either reduce the staff time necessary to for successful operational or minimally not increase it over the current system while producing more accurate and understandable audits. It should provide support for many different types of users with different types of needs. This includes Degree Clerks looking for succinct reports with satisfied requirements rolled up and detailed information for unsatisfied requirements, departmental staff looking for specialized reports including alternative requirements and GPA groups for hard to satisfy major requirements, Advisors looking for efficient program planning information, and of course students expecting an intuitive and concise analysis of work completed.

d) *What functionality is included in the new system that is not in the old system?*

The most fundamental difference between the current and proposed system is that the current system defines requirements individually each associated with a list of classes satisfying the specific requirement while the proposed system uses a modular approach defining requirement sets which can be reused as needed. This makes encoding more efficient by allowing for reuse and makes the support of substitutions and exemptions simpler allowing for the distribution of that function to departmental staff.

In particular the proposed system allows for the encoding of several degree requirements which are simply not possible using the current system including:

a. the accurate support of Minors  
b. the new General Education (GE) requirements  
c. the applicability of GE cluster credit  
d. the coding of Honors requirements  
e. the coding of NCAA requirements  
f. support for the Residency requirement  
g. the accurate support of Double majors

The proposed system includes a Transfer Articulation module. Our current system has no such functionality, instead requiring the evaluation of each class taken by each student transferring credit individually. Using the proposed system articulation logic for each school can be entered and maintained making the individual application of that logic unnecessary.

Another significant difference involves the way in which audit information is returned back to requestors by the system. The current system returns information in a fixed report known as the Degree Progress Report. The proposed system returns audit information as an XML stream via a web
service allowing for maximum flexibility in supporting user need and providing the means to deliver audit information in a way consistent with organizational practices and web based systems.

Use of a web service also provides the means to integrate the proposed system with other systems on campus regardless of platform in ways impossible for the current system.

3) Operational Scope

a) How will the system be extended to other academic units?

Current Users

The most comprehensive use of the current DAUD system since its inception has been by the College of Letters & Science which comprises 195 majors, 55 minors and 12 specializations within 194 departments and the School of Arts & Architecture which has 4 majors and 1 specialization. Both schools use the system to track:

- individual College proficiencies
- University requirements and proficiencies
- major requirements
- minor requirements
- specialization requirements

Due to system limitations and the scarcity of training resources, the School of Theater, Film & Television has used the current system only intermittently over the past decade, and now mostly to track and report base student information. However, all three academic units use the current system to display the manual transfer course articulation data, UCLA course data and student profile information.

System expansion—design

While the primary goal of the replacement system is to ensure that the present and anticipated needs of the current users (see above) be met, the ancillary goal is to design a system flexible enough to accommodate an expansion of the system to all students whose course records are maintained within the central campus administrative systems. Toward this end, representatives from academic units that met this criterion (the Law School, the Graduate Division, the HSSEAS, the School of Nursing and the Anderson School of Management) were invited to participate in the planning of the new system. While performing the actual expansion will require funding for encoding and necessary modifications to user components, the continued participation in this process by representatives from eligible academic units has played an important role in ensuring that the new degree audit system will easily accommodate the extension of its services to their respective units.
**System expansion—development**

One of the advantages of the modular structure of DARS is that groups with very different needs can have their requirements encoded each depending on separate fundamental reference tables. Hence, each school or academic unit can develop and implement their respective requirements according to the needs of their own particular schedule without concern for potential conflict with another system user.

Participating academic units will have the option of either outsourcing the actual encoding and maintenance of their degree structures or conducting the encoding and maintenance in-house. In either case, Miami University offers both ongoing, multi-level encoding training as well as ad-hoc assistance with DARS-related development and encoding.

b) *What are the on-going operational support requirements and how will these be accomplished?*

In its initial development for the College of Letters & Science, the School of Arts & Architecture and the School of Theatre, Film and Television, the new degree audit system, will require an operational support structure that will be comprised of the following basic components, each one requiring its own support infrastructure: server hardware, degree audit engine software (DARwin) and database (Oracle or SQL) support, degree encoding maintenance, web interface applications, mainframe data exchange as well as user training and support. College Information Services will provide the necessary support for each component with the cooperation and resources of the affected unit.

**Server Hardware and infrastructure support**

The new replacement degree audit server hardware and infrastructure will initially be housed within College Information Services (CIS) in Murphy Hall. Future locations of hardware and associated infrastructure may include the Administrative Information Services (AIS) server room located in the Math Sciences Building. Regardless of which server/database platform selected, AIX/Oracle or Windows/SQL, CIS will assume responsibility for maintaining the server hardware and infrastructure for the new degree audit system with existing personnel. Using the FTE previously allocated for this purpose, AIS will continue to support the hardware and infrastructure for the existing degree audit system. As the new replacement system is implemented and the existing degree audit system is phased out, this FTE will shift from the existing system to the new replacement system commensurate with need. Once the current system is phased out completely, it is anticipated that the FTE originally allocated to the current system will be shifted 100% to the new system.
Degree Audit Engine Software (DARwin) and database support
The original developers of the core degree audit engine (DARwin) at Miami University in Oxford Ohio continue to publish periodic software upgrades of the core engine, PowerBuilder encoders’ interface and miscellaneous supporting utilities. These upgrades and software enhancements reflect the direct input from the 140+ domestic and International Universities currently using DARwin. CIS has chosen to work directly with the developers at Miami University for enhancements and upgrades to the core engine in order to ensure that interfaces developed by CIS and other units will seamlessly interact with the core engine.

Database
As database development, maintenance and connectivity are integral to degree audit processing, the support for these activities are under the direction of CIS and will continue to be so once the database platform has been finalized and for the duration of the project.

Degree Encoding Maintenance Support
College Information Services is responsible for the initial encoding of all university, college, major, minor and specialization requirements for the College of Letters & Science, the School of Arts and Architecture and the School of Theatre, Film and Television. Once the new degree audit system has been implemented, CIS will continue to support (revise and update) encoding requirements for the College and both schools.

Initial Transfer Course Articulation (TCA) encoding will be the responsibility of the Undergraduate Admissions office with the assistance of CIS as needed. One FTE has been budgeted for the encoding of TCA rules and will be maintained after implementation subject to annual review.

Web Interface Application Support
CIS will assume the responsibility for the initial development of web-based user components to the core degree audit engine. Web-based components include an Undergraduate Admissions interface for inputting “raw” transfer course information, achievement scores and tests, Counselor and auditors input screens for substitutions and exemptions, XML output for websites and portals and ad-hoc and batch printing processes. Web-based component maintenance for displaying audits based on this XML will be the responsibility of each web and/or portal owner. The maintenance of these components will continue to be the responsibility of CIS after system implementation.

Mainframe Data Exchange Support
Until a final decision regarding server architecture is made, the responsibility for developing and maintaining mainframe data exchange connectivity is
difficult to identify. It is certain, however, that AIS will play a significant role.

**Training**

The complexity of encoding requirements using the new replacement degree audit system will require ongoing training from Miami University which offers a multifaceted training support program including: local and web-based multiple-level encoder and TCA training, web-based knowledge bases as well as an encoders’ listserv. Annual encoder’s workshops and seminars are also offered by users groups and the DARS team at Miami University.

The ongoing support and training for counselors, auditors and student is discussed in the next question regarding user base support.

c) *How will the user base be supported for functional and use questions?*

The user base for the current degree audit system and for rollout of the new replacement system are the same and consist primarily of undergraduate admissions officers, academic counselors, degree auditors and students. The delivery of support for functional and use questions for the new replacement system will fall primarily on College Information Services whereas in the existing system, a part of that responsibility is shared with the Registrar’s Office and Undergraduate Admissions.

Academic counselors and degree auditors are currently trained in the navigation of SIS and SRS-based DAUD screens primarily by the Registrar’s office whereas application training on the various functions of the current degree audit system is the sole responsibility of CIS which conducts semi-annual workgroup trainings and ad-hoc individual training sessions for academic counselors and degree auditors. All use questions regarding the current degree audit system are handled solely by CIS with the exception the Admissions Office application screens.

Functional and use questions regarding the new replacement system will be primarily the responsibility of CIS with support from Miami University. The benefit of acquiring a commercial application is the additional resources available not only from the application developers but from a significant networked user base in over 140+ installations nationwide. Questions from academic counselors and degree auditors will be fielded through the CIS Help-Desk and escalated when necessary. Training in application use (substitutions, exemptions, printing, viewing, reporting) will be conducted CIS workshops and ad-hoc individual training sessions.

The advantage of web-based delivery and data collection mechanisms is the ability for a wide-range of help-desk delivery alternatives. Help-Desk information can be delivered via online chat sessions, desktop remote control
functionality, online help screens, email, electronic faqs, listserv searches, database repositories and web knowledge bases in addition to phone support and in-person training programs.

Students are counseled in the reading and interpretation of degree audit information by academic counselor starting at Orientation prior to their attendance at UCLA. College, School and department counselors continue the knowledge transfer to students augmented by email degree progress faqs, MyUCLA online help, virtual counseling hours and in-person counseling appointments. Currently, students receive personalized assistance with the degree audit information by direct contact with CIS Help-Desk phone or walk-in support. All these delivery mechanisms for information dissemination are anticipated to remain intact for the new replacement system.

d) What is the migration plan from old to new system?

The current degree audit system will exist in tandem with the new system in order to provide support for those students who entered UCLA prior to winter quarter of 2005—the rollout date for the new system and subsequent to spring 1988. The current degree audit system will be phased out once the population of students supported by that system has diminished to the point that stakeholders agree that the system is no longer fiscally prudent to maintain (a transition period that is predicted to last fewer than 8 years). During this transition period students will be audited under one system or the other (never both) depending upon their date of admission.2

For this migration plan to work the encoding structures and infrastructure for the current degree audit system will need to be maintained (including “bug” fixes)—system enhancements, however, will cease once the new replacement degree audit system is operative. (See Server Hardware and Infrastructure Support above for more detail about the distribution of the FTEs required for data exchange support.)

Impact of Migration Strategy on End-user
There will be no significant impact on users during the transition for screen based audit reports, ad-hoc print requests, nor batch print requests.

Screen based audit requests will be automatically forwarded to the current or proposed system by the host web page using profile information (admit or audit term) about the student for whom the audit is being requested. Ad-hoc print requests would be handled in an equivalent manner.

2 The degree audit information for those few students who will be using the current system after that point will be available in an archive created specifically for this purpose.
Batch print requests are a little more complicated because students who utilize both systems could be included in a single batch. To simplify the process and ensure that individual batch requestors are not expected to separate students themselves CIS will design a new batch service request channel which will do the sorting for the requestor bifurcating audits to the current or proposed system as appropriate.

4) **User Scope**

**Questions:**

a) *Who are the users and how will they use the system?*

The primary users of the new replacement degree audit system include undergraduate students, academic counselors, and staff within the College of Letters & Science, the School of Arts & Architecture, and the School of Theatre, Film and Television, Undergraduate Admissions evaluators and Registrar degree auditors. Peripheral benefit is currently enjoyed by the HSSEAS and the School of Nursing which utilize the current system as a reporting mechanism for transfer course articulation data and UCLA coursework summaries as well as the Law School which uses it to glean transfer course summary data.

Automated degree checking systems allows students, academic counselors, staff and degree auditor to track and evaluate a student’s progress toward the completion of degree requirements.

**Students**

Students can use online and printed degree audit reports for a variety of purposes including:

- evaluating progress to degree
- planning course enrollment
- tracking advanced standing coursework credit
- verifying the receipt of achievement scores and placement tests
- checking the status of petition for exemptions and substitutions to course requirements,
- course grade verification
- enrollment verification
- GPA calculations

Students can also use the system to assess what impact a change in degree goals (adding a major, dropping a minor etc.) might have on progress to degree.

**Advising and Support Staff**

Academic counselors and support staff can use the automatic degree system to perform all the functions described above as well as those described below:
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- replacing manual degree checks with automated degree checks
- screening applicants for program eligibility,
- certifying GPA
- screening for compliance with course sequence and repeat rules as well as minimum and maximum limitations and standards (university, college or school and department)
- processing substitutions and exemptions

UARS and Transfer Course Articulation
A significant advantage of the new degree audit system will be the centralization and systematizing of the repository of transfer course articulation data within the Undergraduate Admissions Office. Currently, Undergraduate Admissions officers manually evaluate coursework taken outside UCLA for articulation to UCLA coursework and application to UCLA’s various programmatic requirements for each student. The new degree audit replacement system will allow for the streamlining of articulation and evaluation of transfer coursework by replacing this manual process with the mechanized application of articulation rules and regulations for each transfer school. Every student’s ‘raw’ coursework will be input into the new replacement system so that Undergraduate Admissions encoded rules and regulations can be applied against this transfer institution's ‘raw’ coursework data generating UCLA equivalent coursework and non-articulated title coursework for application on a student’s various degree programs and requirements. The downside of this mechanization is that these articulation rules must be maintained, and that the raw transfer coursework must be added. Moreover, a manual review process will be necessary for an unforeseen time to make sure that all articulations are accurate and to add any articulation information for school work not yet encoded into the system.

One FTE has been allotted in the budget for this process in the hopes of getting the majority of schools supplying the majority of students encoded and kept up-to-date. It is anticipated that the cost savings from migrating from a manual resource-intensive process of transfer course articulation to a semi-automatic process will offset the resource allocation needed to maintain the articulation tables.

Degree Auditors
In the current system the degree auditors in the Registrar’s Office use printed and online degree audit reports to verify that a student has fulfilled all university, college and departmental requirements for graduation (majors and minors), including any applicable programs (e.g., specializations). This

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3 Counselors and degree auditors currently manually enter substitutions and exemptions for a given student and given course in a repetitive and time-consuming tasks that is subject to academic programmatic changes. The new replacement degree audit system will streamline this process by moving course substitution and exemptions from a requirement-based level to a course-applicability paradigm that will transfer across various degree programs thereby eliminating the duplicative process.
process will be enhanced in the new system in order to further systematize and streamline the degree granting process. For example, web-based utilities will allow for various degree audit reports to be generated that can include reports of only unsatisfied requirements, In-Progress requirements and/or the completion of all degree requirements and programs. These enhanced reporting features can be tailored and generated to specific job-related tasks which will result in a faster degree granting process.

b) *How will each constituent population access the system?*

**DARS Encoders**
The encoders of degree requirements who are charged with encoding of all University, College and Department rules and regulations as well as supporting tables (grade tables, string tables, sequence and duplication tables, conditional use tables, etc.) will access the system through the PowerBuilder application which was written and maintained by the DARS team at Miami University.

**UARS Evaluators**
Undergraduate Admissions evaluator(s) who are responsible for encoding the transfer articulation rules and regulations for the various transfer institutions will access the system via the PowerBuilder application described above. Undergraduate Admissions office staff who will assume the responsibility for entering “raw” transfer course data will use web pages built into Counselor Desktop.

**Students**
The largest population accessing the system will be undergraduate students whose course data records are centrally maintained. Currently, students can request a web-based version of the degree audit report through URSA or order a printed report (the DPR) from their school. Access points for students will be expanded to include MyUCLA, URSA, and other approved web systems who use ISIS4 authorization and can demonstrate a reliable authorization strategy. These websites will be approved before access is granted to the Web Service from which audit data would be received.

**Academic Counselors, Degree Auditors and Staff**
Currently academic counselors and staff have two distinct access points for requesting and generating degree reports and performing degree audit-related tasks; OASIS screens for printing and online viewing of reports and entering course substitutions and exemptions and Counselor Desktop. The new replacement system’s access point will remain the Counselor Desktop which will have separate screens to support substitution and exemption functionality from requesting an audit on behalf of a student. Course substitutions and exemptions for students on the current system will continue to be accessed via OASIS screens only.
Existing access points for the current system will remain intact until the system is retired. User requests for audits made through the Counselor Desktop will automatically forward to the current or new system as appropriate. Requests made through OASIS on behalf of students needing processing under the new system will receive an error message from OASIS advising them to make their request via Counselor Desktop.

c) **What are the mechanisms to manage user access?**

i) **What external systems are needed?**

The mechanisms for managing user access to the existing system are not expected to change with the implementation of the new system. Mechanisms for managing user access for the new degree audit system will be handled directly by CIS who will be responsible for the degree audit database, core software, server(s) and infrastructure. These users (Undergraduate Admissions TCA encoders as well as encoders for the College and schools) will be issued login credentials by CIS to update the database directly via the PowerBuilder application and Undergraduate Admissions ‘raw’ transfer course input screens. CIS will conduct periodic reviews of individuals who have been assigned degree audit authentication credentials and the appropriateness of their access.

End-users (academic counselors, degree auditors, and staff) will authenticate with their individual campus credentials via UCLA’s common authentication (ISIS). A database of authenticated users for academic counselors, degree auditors, and appropriate staff by college or school and degree audit function will be maintained by CIS for update access to substitutions and exemption processing and requesting degree audit reports. Login and authentication will be available on MyUCLA, CIS’s Counselor Desktop, URSA and other campus websites and portals for these users.

Student access to degree audit reporting will be limited to requesting degree audits for themselves only and common campus credential authentication will be used via MyUCLA, URSA and other campus websites and portals.

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4 Academic counselors and staff access the current degree audit system through AIS login credentials and student-record read and update access rights (where needed) granted by the Registrar’s office. The request for update access is either initiated by CIS for College HUP and P&D personnel or in consultation with other departments and schools. (CIS verifies that the requestor has been trained in the mechanics of updating degree audit code and/or substitutions and exemptions.) Those requesting view only access may request such access directly through their DACCS coordinator or designee with consultation with AIS.

Undergraduate Admissions and Registrars personnel access to degree audit elements is handled by their local DACCS coordinators or designee via AIS login credentials.
CIS will maintain update access mechanisms to the degree audit system for all schools and colleges and will rely on the common campus authentication services for generating degree audit reports hence we are dependant on ISIS authentication to remain available and stable.

**d) How will users be informed and trained on the new system?**

**Students**
Since the migration to a new degree audit system will be seamless to students who will be exposed to only one system, either the new replacements degree audit system or the existing system, no new training will need to be developed or implemented to convert students from one system to the other. Currently, CIS is charged with training all Orientation Counselors yearly on the degree audit system and as such Orientation counselors will disseminate to incoming students, Freshman and Transfer, information on accessing the new degree audit report and related screens. Since the rollout of the new replacement system will occur simultaneously for all students entering UCLA Winter 2005, this annual training will need only focus on the new degree audit system.

**DARS Encoders**
The complexity of DARS necessitates ongoing training for both Transfer Articulation and Degree Requirement encoders. Miami University offers a multifaceted training support program including, onsite (Oxford, Ohio), local and web-based multi-level encoder and TCA training and web-based knowledge bases and an encoders’ listserv to assist in encoding and training. Annual encoder’s workshops and seminars are also available and offered by users groups and the DARS team at Miami University.

**Academic Counselors and Staff, Degree Auditors**
CIS currently trains academic counselors, staff and degree auditors in the use of various applications within the current degree audit system and will continue with quarterly group training sessions as well as individual training programs, especially in the application of substitutions and exemptions which will be significantly different from the existing system. CIS will staff and make available a Help-Desk to field degree audit related questions and training requests.

CIS maintains a current list of academic counselors, staff, and degree auditors who use the current system for producing degree audit reports as well as updating substitutions, exemptions and encoding degree structures. This list will be utilized to contact these users and provide group training sessions in accessing, navigation and input process of the newly developed web-based degree audit screens. CIS will develop the Admissions ‘raw’ transfer course input screens and will train and develop Admissions staff in the use of these screens. Periodically, CIS will conduct counselor and staff training sessions,
periodic comprehensive review of the degree audit replacement system

usability studies, and broad-based user forums to receive use and enhancement feedback.

e) How are the costs of distributed user impacts to be covered?

Currently, costs associated with degree audit functionality are spread across the college, departments, schools, offices utilizing various aspects of the system. For example, Undergraduate Admissions is responsible for articulation of transfer coursework and will continue do so with the new system shifting from manually encoding post-articulated coursework to inputting ‘raw’ coursework and transfer course articulation (TCA) rules and regulations. Costs associated with the ongoing maintenance of TCA rules and regulations and the inputting of ‘raw’ coursework should be absorbed by cost savings realized from moving from a manual articulation process to a mechanized one. To complete the initial encoding of articulation rules and regulations, one FTE has been allocated to Admissions during the development phase and for maintenance after implementation. All maintenance staffing will be reviewed annually.

As mentioned previously in these questions, AIS-related costs of maintaining connectivity between the mainframe and the new replacement degree audit system can be shifted away from the FTE dedicated to the current system to the new system as warranted. System enhancements to the old system will cease once the new replacement system is operational.

No distributed user impact costs are anticipated to be incurred by the Registrar. However, .25 FTE has been reserved for unforeseen costs associated with the new degree audit system during the development phase.

The cost savings caused by the centralization of encoding responsibilities into CIS from the School of Arts & Architecture and the School of Theater, Film, and Television will more than offset any impact these two Schools might feel from the new degree audit system.

Although ad-hoc printing requests will be supported by the requestor the small size of such requests make any such costs trivial.

Costs related to the printing of large batch reports will be recharged back to the requestor to offset the cost of using centralized campus printing services. These costs should be minimal as the new system can offer many alternatives to large print runs of complete audit reports.
f) *What usability tests have been conducted or planned for the user interface?*

Since no user interfaces have been developed for the new degree audit system no emphasis has yet been placed on usability studies, CIS has found usability studies to be very effective and many are planned including at least one for each component including the UARS source input module, the substitution and exemption web page planned for Counselor Desktop, and finally, the degree audit web page planned for inclusion within MyUCLA based on the XML stream.

5) **Interdependencies**

a) *How does this system interface with other projects?*

i) *What are the dependencies?*

The fundamental operation of the proposed Degree Audit system is to extract enrollment and profile information out of the Student Records data, analyze that data in terms of an appropriate degree requirement template, and report the results to the audit requestor. The system, when appropriate, also updates course flags in Student Records when it identifies use and reuse violations. Hence the system is fundamentally linked to Student Records as it does both reading and writing of Student Record data.

Consequently the project is linked to the Student Records Data Base Rationalization (SRDB Rationalization) project and the new student records transactional system. The proposed system’s modularity allows us the luxury of using the VSAM data as a basis for audits until the current system is completely phased out and then easily switching to the new DB2 tables created as part of the SRDB Rationalization project. This dependency does not extend the need for maintenance of the old VSAM files because the current system is completely dependent on the VSAM files for operation.

The proposed system also interfaces with other projects, albeit to a lesser degree. The Web Service delivery of audit data means that URSA and MyUCLA (as well as other websites popular with students) can offer their own fully functional degree audits in a manner consistent with their own objectives and design. Finally, since the new CMS project is being built on Web Service architecture, the CMS will be able to extract the audit information necessary to develop course tools from the degree audit web service.
b. How does this system interface with other systems?

   i. What interfaces are needed?
   ii. How is the development and maintenance coordinated?

As described above, the proposed system is fundamentally linked to the Student Records system both by reading from and writing data to the SRS. Data is imported from the Student Records system via a customizable API in the DARWin system which was developed by and will be managed by AIS (assuming a UNIX/Oracle architecture—the interface that would be used with a Windows/SQL architecture has not yet been determined). Data will be written back to the Student Records data in several ways and under many different scenarios. Transfer articulation will be written back in such a way that the functionality of the TRCD and TRCS screens in OASIS can be easily maintained. Such an update would be developed closely with AIS and the Registrars’ Office and managed by CIS. The updating of course data directly into the VSAM files will be accomplished with the assistance of AIS while the management of the connection will be left to CIS.

We are also planning to work closely with UARS staff in order to provide the best possible web-based interface through which UARS staff can perform the following tasks: enter transfer work, manually correct partial transfer articulations, and append additional transfer work. CIS will retain the responsibility of managing these web pages for the foreseeable future.

Departmental advisors will use another web interface developed and maintained by CIS through which Degree requirement substitutions and exemptions will be entered on behalf of students.

Finally, the system will support the printing of both batch and ad-hoc requests. Although ad-hoc requests will be sent back to the requestor’s web browser for local printing if desired requests for batch printouts will be directed out to the central campus printing service.

6) Schedule

   Questions:

   a) How does progress compare with the plan to date?

   The completion of the Proof of Concept (PoC) project produced a great head start towards the development of the new system. Since the PoC was completed last December we have continued to make progress towards but the unavailability of additional staff funds prior to project review has slowed this progress. Other progress as projected in the plan is on schedule. We have
installed two operating systems and database platforms and have operating audit systems running on both. In addition, transfer course articulation rules and regulations for several community colleges, a 4-year university and Achievement and test-score infrastructure as well as supporting tables have been encoded. Connectivity between the university mainframe and the degree audit system as well as the successful transfer of student data has been demonstrated and data mapping between the mainframe and the server continues.

The unanticipated support of DARWin on a Windows/SQL environment has changed our original schedule so that a complete analysis of this preferred approach can be conducted before a final server platform is selected. Initial tests conducted by several universities indicate that Windows/SQL is a workable and potentially cost-saving alternative to AIX/Oracle.

We anticipate analyzing the results of a large scale switch from DARS mainframe version to DARWin on the newly adopted Windows/SQL platform at a Midwest School comparable in size and complexity to our own.

With the hiring of a degree audit encoder, significant progress has been and continues to be achieved independent of platform commitments, development of supporting web-applications or TCA interfaces. Progress in this area is expected to continue so that implementation in winter 2005 will include the encoding of all degree programs, university requirements, general education requirements and school and college requirements for the College of Letters & Science, the School of Arts and Architecture and the School of Theatre, Film and Television.

Several UARS evaluators have undergone extensive transfer course articulation training at Miami University and other UARS staff meet weekly to establish encoding protocols, translate articulation policies and regulations into encoding structures, define and articulate encoding expectations and requirements.

Stakeholders continue to meet weekly finalizing details of the Project Control Document and by the time of this review we expect to have it signed.

7) Assumptions

a. Are the assumptions used to build the original estimates still valid?

Many of our original assumptions—particularly those regarding the needs of UCLA—remain solid: the complexity and type of degree requirements, the implications for existing processes, and effective ways to make the proposed system dovetail and enhance existing and planned systems on campus.
Because of the unanticipated support of a Windows/SQL architecture for DARWin our assumptions regarding DARWin support may prove to be unnecessarily pessimistic.

The steadily increasing popularity of DARWin in lieu of the original mainframe version of DARS has not been surprising. The client/server architecture continues to attract new schools and many loyal DARS schools are in one stage or another of switching platforms. What has been surprising is the accelerated expansion of support for DARWin. When the design for the proposed new degree audit system was originally developed, UNIX was the only server architecture available. In the last twelve months, however, the DARS development team at Miami University has expanded DARWin support to include Windows/SQL Server architecture. Staff expertise and our investment in Windows/SQL development tools make this a very attractive alternative. Our assumption that the campus would need to rely on AIX/Oracle architecture and the infrastructure necessary to connect such a server to the other campus resources is seriously challenged.

Finally, although we believe we demonstrated due diligence in the investigation of the level of staff support necessary to develop and maintain encoding rules for both Transfer Articulation and Degree Requirements, our experience utilizing one full time encoder has illustrated the intensive nature of this support. While we never trivialized the work necessary we had assumed it would not be as involved and complex as it has proven to be.

**b. What are the vulnerabilities and risks for the project and how are they covered?**

Certain risks are inherent in any project of this complexity including:

- the unavailability of critical staff in partner organizations
- an unexpected expansion of project scope
- loss of or inability to retain our own critical staff

**Critical Staff**

To minimize the risk that one of our partner organizations might lose a critical staff member to other responsibilities we have budgeted for the hiring of new staff that can be used to back-fill or perform critical project duties. We have also planned our project timeline to minimize the damage that might be incurred as the result of such a resource shortfall.

The loss of or inability to retain one’s own staff is always an unhappy thought. With reference to the encoding of this system’s requirements however, our use of DARS, the most popular auditing system, (see appendix B) ensures that a knowledgeable experienced replacement can be hired. Moreover, we are
Periodic Comprehensive Review of the Degree Audit Replacement System

lucky to have sufficient programming talent so that the temporary loss of a staff member would not halt development.

Scope
To eliminate “scope creep” our Project Control Document (PCD) includes very specific language describing what is and what is not included in the scope of this project. Already many excellent enhancements (the “Student Plan,” for example) have been put on hold to be developed after this project is complete.

In addition this project has its own particular vulnerabilities including:

- failing to meet the needs of a large cohort of new transfer students
- failing to provide sufficient modularity and generality in design to support the needs of organizations not included in this base project
- using a third party auditing engine

We have scheduled our implementation for a winter quarter in order to substantially reduce the size of the impacted population. In this way we can aim for a gradual rollout with plenty of leeway for unexpected bug fixing and manual intervention.

By including amongst our stakeholder representatives from Grad Division, HSSEAS, and the School of Law we have benefited from their ongoing oversight to ensure future compatibility.

Finally, the enormous user base enjoyed by DARS ensures that the back-end auditing engine has great flexibility and that the DARS support team at Miami University is well equipped to add additional flexibility as identified.

The impressive user base, track record, and enormous success of DARS combined with its university as opposed to commercial sponsorship mitigates the risk of being dependent on a third part product for the auditing engine.