1. Introduction & Purpose

1.1. Purpose
The purpose of this document is to establish the scope, schedule and assumptions for the development and implementation of a new Degree Audit system designed to replace an aging system (created in 1987) that has already exceeded its capacity to accommodate the increasing complexity of UCLA degree requirements. The new Degree Audit system will provide degree audit services for undergraduates in the College of Letters & Science, the School of Arts & Architecture and the School of Theater, Film & Television as well as transfer articulation information for all UCLA undergraduates. Moreover, the system will be designed to provide degree audit support for students campus-wide, and to furnish the data necessary to inform course planning and resource allocation.

1.2 Audience
The primary audience for this document is the Degree Audit Stakeholder group which is comprised of the following units:

- Administrative Information Systems
- College of Letters & Science
- Graduate Division
- Registrar’s Office
- School of Arts & Architecture
- HSSEAS
- School of Law
- School of Theater, Film & Television
- Student Academic Services
- Undergraduate Admissions

1.3. Description and History of Project
The development of the Degree Audit Replacement system is the most recent phase of a process that began in the winter of 1997 when a functional review was undertaken to determine what the University needed in an improved Degree Audit system. This process resulted in the drafting of two initiatives for what became the ISTIP Degree Audit Enhancement project: the first focused on enhancements to the current Degree Audit system (completed in October of 2000), while the second produced the specifications necessary for a Proof of Concept for the Replacement system (completed in December of 2002). The focus of this document is to lay out the work necessary to
develop and implement the new system as well as to outline the preliminary specifications for its projected enhancements and maintenance.

1.4. Summary of Work to Date

- Completed Proof of Concept for the replacement system
- Purchased, installed and configured two sets of servers to compare alternative platform performance including:
  - 2 sets of operating systems
  - 2 sets of database systems
  - 2 versions of the DARS server
- Hired one of two DARS encoders needed to encode academic requirements
- Provided DARs training for critical staff
- Encoded 15% of base system degree requirements

1.5 Description of Approach to Managing Changes to Scope, Schedule, and Assumptions

The Degree Audit Stakeholders are responsible for identifying and managing changes to scope, schedule and assumptions. Changes will be tracked on the CIS website (www.college.ucla.edu/cis/projects/daud.htm) and the campus ISTIP/UTIPP site (istip.ais.ucla.edu). Issues will be covered through the monthly reports (see below).

The Stakeholders are responsible for bringing changes to the attention of management through monthly reports which are reviewed by the ISTIP/UTIPP Management Group and on a quarterly basis by the Enterprise Computing Committee. All approved scope changes will be reflected in a revised Project Control Document as well as in any and all work plans affecting this project. Campus review of the project will be achieved through periodic comprehensive reviews, as directed by the Associate Vice Chancellor of IT.

2. Scope

2.1 Introduction/Description of Bounds of Project

The new degree audit system will provide enhanced services to a broader range of students. Innovations include a new transfer articulation component, greater integration with the Student Information System, enhanced web-based interactive delivery and a modular design which can be used to provide resource allocation data to inform efficient class planning. The system will provide transfer articulation information for all undergraduates and perform academic audits for students in the three academic units using the
current system: the College of Letters & Science and School of Arts & Architecture and the School of Theater, Film & Television. The flexible design can accommodate an expansion of the degree audit system to include all students whose course records are maintained within the central campus administrative systems.

2.2. Project Objectives

2.2.1 Improve both the quality of and access to degree audit information for UCLA undergraduates.

- Students will be able to request and receive degree progress information through multiple web access points such as URSA and MyUCLA.
- Students will also be able to model alternative majors, minors, concentrations and/or specializations.
- Students will be able to request a list of classes which will meet unfilled requirements.
- Students will be able to request information on how a non-UCLA course will transfer to UCLA for schools where UCLA has established articulation agreements.

2.2.2 Improve the use of Degree Audit information as an advising tool for UCLA Counselors

- Counselors will be able to request and receive degree progress information for their students.
- Counselors will be able to model their students into alternative majors, minors, concentrations and/or specializations via the web.
- Counselors will be able to use simplified web screens to grant standardized substitutions and exemptions for their students.

2.2.3 Improve the ease of use and the efficiency of the process used to articulated transfer course information by UARS staff.

- The majority of transfer credit (not the majority of “transfer” institutions) will be articulated into UCLA equivalencies or title credit based on transfer articulation rules encoded into the system instead of individual decisions by UARS evaluators. The review and adjustment of non-system transfer articulation credit by UARS staff will be conducted on an “as needed” basis.
- UARS staff will review and update transfer credit articulation agreements that are encoded in the system on a regular and ongoing cycle so as to systemitize and centralize the repository of transfer articulations.
• Once rules have been defined for the interpretation of standardized tests and proficiencies the DARS system will assess their applicability for coursework.
• The seamless re-application of the rules governing major requirements will accommodate changes to the major without requiring a complete re-articulation of transfer credit.
• UARS staff will have access to both the raw transfer course (source) data and the articulated coursework stored on the DARS server on an ongoing basis.

2.2.4 Improve the use of Degree Audit information as the means of evaluating and verifying the satisfaction of degree requirements by UCLA Degree Auditors.

• Degree auditors will be able to request and receive graphic representations of degree candidates’ program completion status including their university requirements, general college or school requirements, major requirements, concentration requirements, minor requirements, and/or specialization requirements as appropriate
• Degree auditors and other interested parties will be able to query the degree audit system to determine the program completion status of students with a selected degree expected term, major, minor, specialization, etc.
• Degree auditors will be able to identify shortages on degree requirements and transmit this information to students in a timely fashion
• Degree auditors will be able to monitor the completion of outstanding requirements throughout a student’s expected term of graduation and, if necessary, in subsequent terms
• Degree auditors will be able to use simplified web screens to input standardized substitutions and exemptions for degree candidates
• Degree auditors will be able to certify students for graduation based upon the output of the degree audit system, with minimal need for detailed review and/or departmental approval
• Degree auditors will be able to award degrees and notify students of degree completion in a more automated fashion

2.2.5 Improve the ability of those responsible for encoding requirements to create and maintain system articulations.

• Access to an established group of DARS system experts
• Availability of encoders with DARS system expertise
• Availability of external training facilities
• Reusability of requirement modules
2.3 People and Processes Covered

2.3.1 People and Organizations
- AIS Staff
- College of Letters & Science Staff
- Registrar’s Staff
- School of Arts and Architecture Staff
- School of Theater, Film and Television Staff
- Undergraduate Students
- Undergraduate Admissions Staff
- Staff who employ TRCD screens/transfer articulation information
- HSSEAS

2.3.2 Impacted Processes

2.3.2.1 Counselor use of degree progress information as an advising tool
- Explaining degree progress information
- Organizing and viewing degree progress information
- Using degree progress information to present enrollment options
- Processing of substitutions and exemptions
- Reviewing comprehensive degree audit components such as senior residency
- Advising and course planning
- Distributing Degree Audit reports

2.3.2.2 Degree Audit procedures for evaluating student records
- Organizing and viewing degree progress information
- Assessing student progress to degree
- Monitoring completion of outstanding graduation requirements
- Awarding degrees and notifying students of degree completion
- Inputting substitutions and exemptions for degree candidates
2.3.2.3 Registrar’s processes (other than Degree Audit)

- Processing transcript summary information/ transfer units; high school data
- Sharing student data between Admissions and Registrar’s Offices
- Generating reports
- Updating Degree Audit course inventories
- Updating Data Dictionary
- Updating Program tables

2.3.2.4 Staff who employ TRCD screen/TCA information

- Inputting transfer articulation information
- Accessing transfer articulation information
- Creating and/or triggering TCA reports

2.3.2.5 Student access to and management of academic and degree progress information

- Obtaining academic and degree progress information
- Using various modalities to organize and view degree progress reports
- Accessing information about transfer course articulations

2.3.2.6 Undergraduate Admissions procedures for organizing, codifying and storing student data

- Organizing, storing and accessing admissions data received from postsecondary institutions
- Entering student’s raw transfer course data received from postsecondary institutions with which UCLA has an articulation agreement
- Entering student’s raw transfer course data coursework received from postsecondary institutions with which UCLA does not have an articulation agreement
- Establishing UCLA equivalencies for postsecondary coursework and test scores (AP, IB, A-levels)
- Maintaining (updating) existing articulation agreements
- Increasing the number of schools with which UCLA has articulation agreements
- Storing and obtaining access to raw transfer (source) transcripts and articulated transfer work
- Updating data dictionary
- Updating SIF files
2.4 Volumes of Data Covered

Volume of data – 7/2003

- Major codes = 319
- Minor codes = 58
- Requirements = 2,258 sets (current and historical)
- Course Usage Groups = 20,129 groups of course requirements
- Course Usage List = 460,367 course entries

Anticipated new volume of data: the replacement system will be designed to support all undergraduates and graduate and professional students where their coursework is maintained in the Student Record system. This will increase the number of degree audit reports produced but not significantly increase the volume of data stored on the mainframe.

Articulation Agreements

- California Community College = 113
- California State Universities = 23
- UC Campuses = 9
- Other Schools (4 year/out-of-state/international) = 300+

Volume of course entries transferred:

<table>
<thead>
<tr>
<th>Term Applied</th>
<th>Transfer Courses Applied</th>
</tr>
</thead>
<tbody>
<tr>
<td>02F</td>
<td>78,574</td>
</tr>
<tr>
<td>03W</td>
<td>15,925</td>
</tr>
<tr>
<td>03S</td>
<td>432</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>94,931</strong></td>
</tr>
</tbody>
</table>

2.5 Impact to the Mainframe

Implementing the new Degree Audit system will shift many processes currently performed on the mainframe to the new Degree Audit system server and other processes will be changed:

- The Student Records system on the mainframe will continue as the book-of-record for course and student program data but the logic for transfer credit articulation and degree audits will reside in the new Degree Audit
Mainframe data will be exchanged in real-time basis with the degree audit application server(s) on a reciprocal basis.

- Since the new Degree Audit system will require UCLA course catalog and school index data to process degree audit reports, an appropriate method for transmitting that information from the mainframe to the DARS “driver” will be developed.

- The full implementation of the new system (including those students not served by the current system) will result in an increase in the number of queries (i.e., quantity and frequency of data accessed) to the mainframe.

- Ad hoc requests for printed audit reports will be supported by sending highly formatted "pdf" files back to the requesting web browser. These documents can then be printed locally using a variety of printers. The mainframe will be utilized only as a source of data for those reports.

- The output of batch requests for quantities of printed audit reports will be directed to central campus printing services. All associated costs charged by central campus printing services will be the responsibility of the requestor. The mainframe will be utilized only as a source of data for those reports.

- The new Degree Audit system will include functionality to update class flags when sequence restrictions are violated and to check for substitutions or exemptions which might affect enrollment. However, the Student Record System will not be able to leverage this new resource without updating. Hence, while this functionality might eventually increase mainframe processing load no such increase will happen until the SRS is updated.

- Once the new Degree Audit system is online, entering students (FR & TR) will utilize the new system to track their progress toward degree. Existing students previously encoded in the current system will remain in this system until the decision is made to check their degree requirements manually. The impact to processing load to the mainframe is not expected to increase significantly since a student will utilize either the existing or the replacement system, not both.

- The impact of the new Degree Audit system on the mainframe will be tested and tuned before the new system is implemented.
2.6 Budget
The budget for this project will be covered by ISTIP/UTIPP funds. In addition, all the participating units are expected to devote non-billable Staff resources to the project. The latter expense will be reported in the monthly project reports along with the billed expense so the total cost of the project can be monitored.

Budget figures are dependant on the Windows/SQL or AIX/Oracle choice with totals of $1,080,000 or $1,300,000 respectively. These totals are comprised of software/hardware, licensing and personnel expenses. The $220,000 cost differential between platforms is primarily the result of the difference in software/hardware expenses.

Development
Annualized personnel expenses during the development stage include the following:
One transfer articulation (TA) DARS encoder: $50,000.00
Two non-TA DARS encoders: $100,000.00
Two programmer/analysts: $150,000.00
Management & training expenses: $50,000.00

Maintenance and System Enhancement
Annualized personnel expenses after the development stage (maintenance and system enhancement stage) will cover the costs required to maintain the encoding for University requirements and requirements specific to the College of Letters & Science, the School of Arts & Architecture, the School of Theater, Film & Television:

One TA DARS encoder: $50,000.00
Two non-TA DARS encoders: $100,000.00
One-half programmer/analyst: $37,500.00
Management & training expenses: $25,000.00
Once the development stage has concluded, the allocation for funding of maintenance and system enhancements will be reviewed annually. The funds necessary to encode requirements for other units are not included in the budget for this project. A source of funding for this encoding has not yet been identified.

2.7 Exclusions
Project scope excludes

- Development of EDI/Speede/OCR for transfer credit processing
- CAS – DARS Course Applicability System
- Development of “Student Plan”
- The tools, mechanism and structure necessary for implementing the “Student Plan”
- Encoding requirements based on course records maintained outside of the central campus administrative systems such as those affecting the students in the School of Medicine and the School of Dentistry will not be within the scope of this project as these schools maintain their own course records and course record systems
- Encoding academic requirements for students in the HSSEAS, School of Law and Graduate Division
- Modifying the Student Records system and URSA to check the prerequisites, sequence, substitution and exemption requirements for course enrollment prior to enrollment

3. Schedule
The implementation schedule calls for a winter 2005 roll-out for both freshman and transfer admits. Winter quarter was chosen because the number of impacted students will be significantly less than if the system were to be introduced fall quarter, thereby substantially reducing the risk of system overload and/or failure. Several of the stakeholders felt that this timeframe would better accommodate the staff scheduling needs of their respective groups. Finally, while a fall rollout would require that the system be functioning (implemented and tested) 4-5 months in advance in order to accommodate freshman and transfer admits participating in Summer Orientation, the target date for a winter rollout would be early November, only two months before the beginning of winter quarter.

3.1 See the Degree Audit Project Plan for a detailed description of the timeline, resources, dependencies and Gantt chart for this project.
### 3.2 Major milestones and deliverables for the development of the production system

<table>
<thead>
<tr>
<th>MAJOR MILESTONES</th>
<th>MAJOR ACTIVITIES</th>
<th>MAJOR DELIVERABLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Determine Production Environment</td>
<td>• Install, configure NT/SQL test environment</td>
<td>• Selection of the production environment best suited to the needs of the project</td>
</tr>
<tr>
<td></td>
<td>• Evaluate functionality of NT/SQL</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Assess success of NT/SQL production environment deployed by comparable institutions</td>
<td></td>
</tr>
<tr>
<td>Ensure affected processes remain functional</td>
<td>• Discover the impact of the replacement system on affected people, processes and systems</td>
<td>• Agreement on new approach using the replacement system with each affected area</td>
</tr>
<tr>
<td></td>
<td>• Understand the needs being met by current functionality</td>
<td>• Implementation of new approach (when appropriate) to meet needs of affected processes</td>
</tr>
<tr>
<td></td>
<td>• Analyze ways these needs can be met by the replacement system</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Consider alternative methodologies for meeting these needs</td>
<td></td>
</tr>
<tr>
<td>Determine necessary and sufficient student record data for accurate processing of audits and updating of records</td>
<td>• Agree on necessary data consistency within student records</td>
<td>• Appropriate exchange of applicable student record data to implement accurate processing and updating of student records</td>
</tr>
<tr>
<td></td>
<td>• Identify student record data elements</td>
<td></td>
</tr>
<tr>
<td>Encode degree and transfer articulation requirements</td>
<td>Develop all user components for new system</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------</td>
<td>------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>• Agree on overall data exchange strategy</td>
<td>• Web-based entry of degree substitutions and exemptions</td>
<td></td>
</tr>
<tr>
<td>• Encode University and GE requirements</td>
<td>• Web-based entry of source transfer work</td>
<td></td>
</tr>
<tr>
<td>• Encode major requirements for the College of Letters &amp; Science and the Schools of Arts &amp; Architecture and Theater, Film &amp; Television</td>
<td>• XML stream supporting multiple interfaces for communicating degree progress</td>
<td></td>
</tr>
<tr>
<td>• Encode minor &amp; specialization requirements for the College of Letters &amp; Science and the Schools of Arts &amp; Architecture and Theater, Film &amp; Television</td>
<td>• Web-based individual</td>
<td></td>
</tr>
<tr>
<td>• Encode transfer articulation rules for major feeder schools including community colleges and four year institutions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Encoded undergraduate degree requirements (including minors and specializations) for the College of Letters &amp; Science, A&amp;A and TF&amp;T</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Encoded transfer articulation rules for a majority of major feeder schools</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Master School Reference table that interacts with School Reference table</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Degree audit reports for undergraduate students (including those with double majors, minors and specializations) in the College of Letters &amp; Science, A&amp;A and TF&amp;T</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Develop web-based modules for manually inputting information into the system

Develop a module for automatically delivering test score information into the system

Develop a system supporting individual and batch auditing/printing requests

Configure system in production environment

Configure Test Server

Configure Back-Up Server

Configure Production Server

Successful integration of test, back-up and production servers into CIS infrastructure

Error free running of DARS on test, back-up and production servers

Successful fail over functionality from Production to back-up server

3.3 Dependencies
Success depends on the following factors
• Receiving an appropriate budget
• Continued availability and performance of UCLA project personnel
• Functioning equipment and software
• Continued availability and performance of vendors
• Continued availability of central administrative data repositories
• Ability to effectively interface with existing systems
3.4 Critical Staffing
The success of the project is jeopardized to the extent that any of the following critical resources are not available to support development of the system.

<table>
<thead>
<tr>
<th>UNIT</th>
<th>STAFF MEMBER</th>
<th>AVAILABILITY</th>
<th>POTENTIAL DISRUPTIONS TO AVAILABILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIS</td>
<td>Programmer</td>
<td>0.5 FTE</td>
<td>Support needs for the current degree audit exceeding 0.5 FTE</td>
</tr>
<tr>
<td></td>
<td>Eric Splaver</td>
<td>0.25 FTE</td>
<td>Management responsibilities</td>
</tr>
<tr>
<td></td>
<td>Robert Kilgore</td>
<td>0.75 FTE</td>
<td>Management responsibilities</td>
</tr>
<tr>
<td></td>
<td>Programmers</td>
<td>1.75 FTE</td>
<td>Inability to hire/retain/other projects</td>
</tr>
<tr>
<td></td>
<td>Tracy Shields</td>
<td>1.00 FTE</td>
<td>Retention</td>
</tr>
<tr>
<td></td>
<td>Encoder</td>
<td>1.00 FTE</td>
<td>Inability to hire/retain</td>
</tr>
<tr>
<td>Registrar’s Office</td>
<td>Randy Cirilo and/or Registrar’s staff</td>
<td>0.25 FTE</td>
<td>Other management responsibilities</td>
</tr>
<tr>
<td></td>
<td>Kathleen O’Kane and/or David Darling</td>
<td>0.10 FTE</td>
<td>Admissions Selection (12/1-5/1 each year), management responsibilities</td>
</tr>
<tr>
<td>UARS Articulation / Evaluation Staff</td>
<td></td>
<td>0.25 FTE</td>
<td>Meeting Admissions Selection timelines (12/1-5/1 each year)</td>
</tr>
<tr>
<td></td>
<td>Articulation Encoder</td>
<td>1.00 FTE</td>
<td>Inability to hire/retain</td>
</tr>
<tr>
<td>Other</td>
<td>Programmer</td>
<td>0.25 FTE</td>
<td>Inability to hire/retain</td>
</tr>
</tbody>
</table>

*includes ISTIP/UTIPP billed and non-billed personnel

3.5 Contingencies
Continue with current degree audit system.

4. Assumptions
4.1 Planning

4.1.1. Implementation
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. 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.

4.2 Roles and responsibilities
While College Information Services will be the technical lead for the system, success will depend on all the Degree Audit partners, in particular: UARS will be responsible for encoding the transfer articulations, AIS will be responsible for delivering the course information necessary to produce accurate audits, and the Registrar’s Office will play a key role as the owners of the tables of record for student data.

4.3 Staffing – availability, skill relevance, etc.
All organizations are expected to provide the resources necessary for the success of this project.

4.4 Third party commitments
It is assumed that the DARS development team at Miami University (developers and marketers of DARS & DARwin) will continue to meet the following commitments:
- modify, upgrade and distribute DARS software
- respond to future needs for program enhancements that can be integrated into the core DARS application

4.5 User and transaction volumes
Students (37,000), auditors, advisors and other appropriate administrative staff from over 80 departments across campus will have online access to Degree Audit information as well as the ability to request audit (ad hoc and batch) reports through the web. Batch requests are not expected to exceed 2000 UIDs per run.

4.6 Technologies – Server hardware/software
Although our proof-of-concept was completed using the technology listed under Option B, recent developments at Miami University have presented us with an exciting alternative: running the DARWin server on Microsoft Windows utilizing Microsoft SQL Server. Adopting this solution would result in less of an expenditure on hardware; the option of using server clustering to achieve a higher level of scalability as well as the chance for College Information Services development to leverage existing strengths and experience and reuse tools.

- DAUD Server Option A
  - Application servers: Multiple Wintel multi-processor rack mounted servers
    - OS: Windows 2003 Server
• DARS: Darwin V3.0 (or later)
  o A single hardware based load balancer
  o Database server: Multiple Wintel multi-processor rack mounted servers
    ▪ OS: Windows 2003 Server
    ▪ Database: MS SQL 2000
• DAUD Server Option B
  o Applications & Database Servers: IBM H80, IBM P690
    ▪ OS: IBM AIX 5.2
    ▪ DARS: Darwin V3.0 server (or later)
    ▪ Database: Oracle 9 (or later)

The viability of Option A will be determined by conducting bench mark testing on a test server that incorporates as many of the components of the MS/SQL as possible. Among the factors that will be considered are:
  • the number of degree audits the system can calculate
  • the number of real audits the system can produce per minute
  • whether or not the system can produce in excess of the largest expected batch requests

4.7 Risks
• Attracting and retaining Staff in participating units
• Expanding the scope of work beyond that specified in this document

4.8 Funding—Covered in Section 2.6

4.9 Contingencies
Assume we would continue to run and maintain the current degree audit system until the replacement system is ready.