MIS DATABASE DESIGN OVERVIEW

PURPOSE

The Chancellor's Management Information System has been designed to meet a variety of information needs identified by the Chancellor's Office. The identification process has taken into account both past experience, current, and anticipated needs. The use of the information in the database will be focused on issue identification, policy analysis, program evaluation, and planning.

DESIGN OBJECTIVES

Five basic design objectives underly the Chancellor's database.

1. Accountability the ability to respond to basic questions about the students being served, their demographic characteristics, the courses and services they are utilizing, their goals, and the outcomes they achieve through the community college system.

2. Integration of data the ability to link together related data elements to serve the basic questions discussed above. For example, it should be possible to relate basic student demographic data to course activity data to answer questions about the race and gender of unduplicated headcount of students enrolled in various occupational programs.

3. Quality of data the ability to provide accurate and consistent information on a timely basis. Accuracy and consistency require editing and comparison of data in order to eliminate unreasonable information.

4. Longitudinal tracking the ability to follow the progress of students in meeting their goals, and evaluating institutional performance over time. Policy makers want the ability to measure the success of specific programs (e.g., matriculation) in achieving improved student performance. Such measurements require the ability to follow the performance of students over time.

5. Flexibility the ability to perform a variety of ad hoc analyses using a stable base of data. Emerging issues or changing circumstances should not necessarily be grounds for new data requirements being placed upon the districts.

LAST REVISION: 10/01/00

DATABASE DESIGN

MAJOR CATEGORIES OF INFORMATION

The information system is designed to collect and organize information from three major areas of activities:

- Students;
- Faculty and staff;
- Courses

The Chancellor seeks to collect that data that can provide answers to fundamental questions related to each of the three areas listed. It would be impossible to list every possible question related to the three areas. It is more useful to review the data elements documented in the Dictionary. A review of the Dictionary will reveal the basic nature of information being sought. The use of common linking data elements (Social Security number, TOP and ASA codes, district and college number, etc.) and the use of data base software will allow data to be linked from the various categories in order to respond to a variety of questions.

CHANCELLOR'S OFFICE DATABASE OVERVIEW

As indicated, the Chancellor's Office Management Information System database is actually comprised of several databases that each represent a distinct, logical collection of data that are related together using common linking data elements and database software. The principal databases that represent the major areas of activity are the Student, Section, Course, and Employee databases. Each of these databases is logically broken down into smaller groups of data. For example, the Student database includes the Student Basic Demographic database, the Student DSP&S database, the Student Enrollment database and the Student Financial Aid database.

Each database stores a record for every occurrence of the entity that the database represents. For example, the Student Basic Demographic database represents the entity identified as: STUDENTS. Each record in this database stores demographic data for all students enrolled at every college in the state. College and student identifiers are used to identify individual students (records) at each college. Stored in every record, in addition to identifiers, are data elements that describe the entity. For example, stored in all records of the Student Basic Demographic database are student's gender, ethnicity, birthdate, etc.

The material on the following pages outlines the function of each database and each database sub-group. In addition, the manner in which the databases are related together and their associated data elements are described.
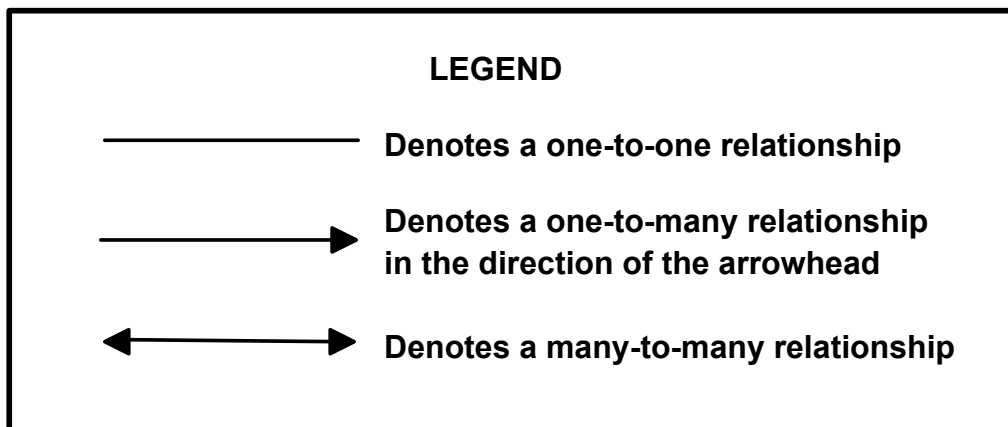
DATABASE DESIGN

Boxes and lines are used on the following pages to illustrate the databases and the relationships between them.   There are three possible relationships that can occur either among two or more databases or database sub-groups. They are:

     (1) one to one,
     (2) one to many,
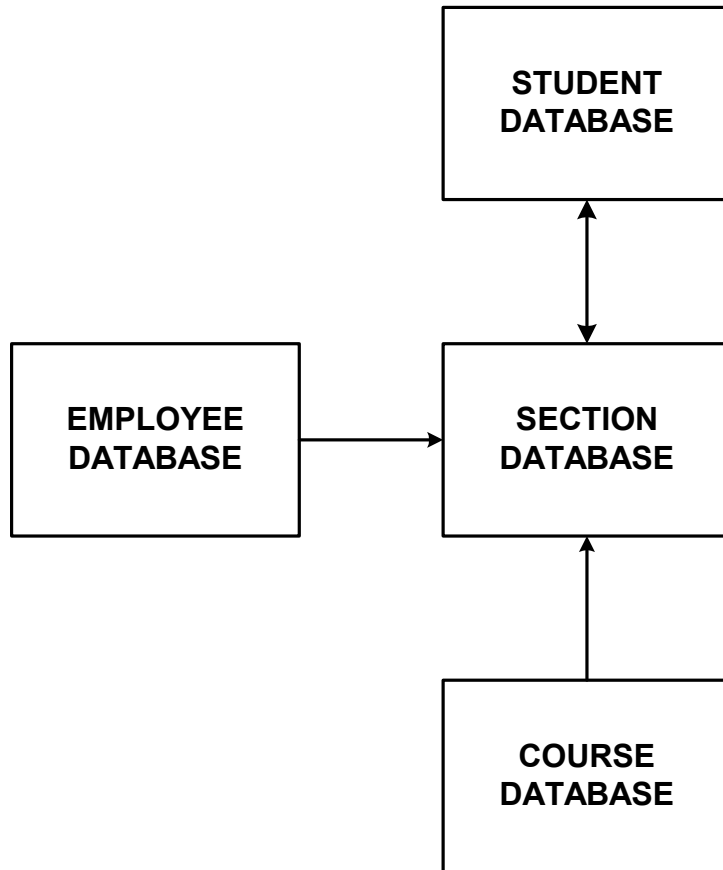   (3) many to many.

An example of a "many to many" relationship exists between the Student and the Section databases (see following pages). For every student enrolled at a college during a given term, those students can be enrolled in one or more course sections. Likewise, every course section offered at the same college can have one or more students enrolled in it.

The lines below are used on the following pages to denote each of the possible relationships that can occur between each database and between each database sub-group. The arrows show the possible relationships that can occur between databases within the reporting period for the databases being related together. For example, a reporting period can consist of a semester or quarter, or in the case of financial aid, an academic year.

LEGEND

———————————— **Denotes a one-to-one relationship**

————————————▶ **Denotes a one-to-many relationship in the direction of the arrowhead**

◀————————————▶ **Denotes a many-to-many relationship**

DATABASE DESIGN

PRINCIPLE DATABASES

```
                    ┌─────────────────┐
                    │     STUDENT     │
                    │    DATABASE     │
                    └─────────────────┘
                             ▲
                             │
                             ▼
┌─────────────────┐  ┌─────────────────┐
│    EMPLOYEE     │  │     SECTION     │
│    DATABASE     │─▶│    DATABASE     │
└─────────────────┘  └─────────────────┘
                             ▲
                             │
                    ┌─────────────────┐
                    │     COURSE      │
                    │    DATABASE     │
                    └─────────────────┘
```

SUPPORT DATABASES

```
┌─────────────────┐
│   COLLEGE       │
│   CDS CODES     │
│   CIP CODES     │
│   CALENDAR      │
└─────────────────┘
```
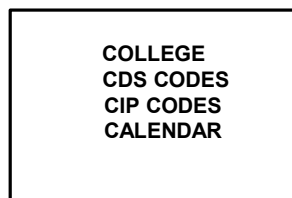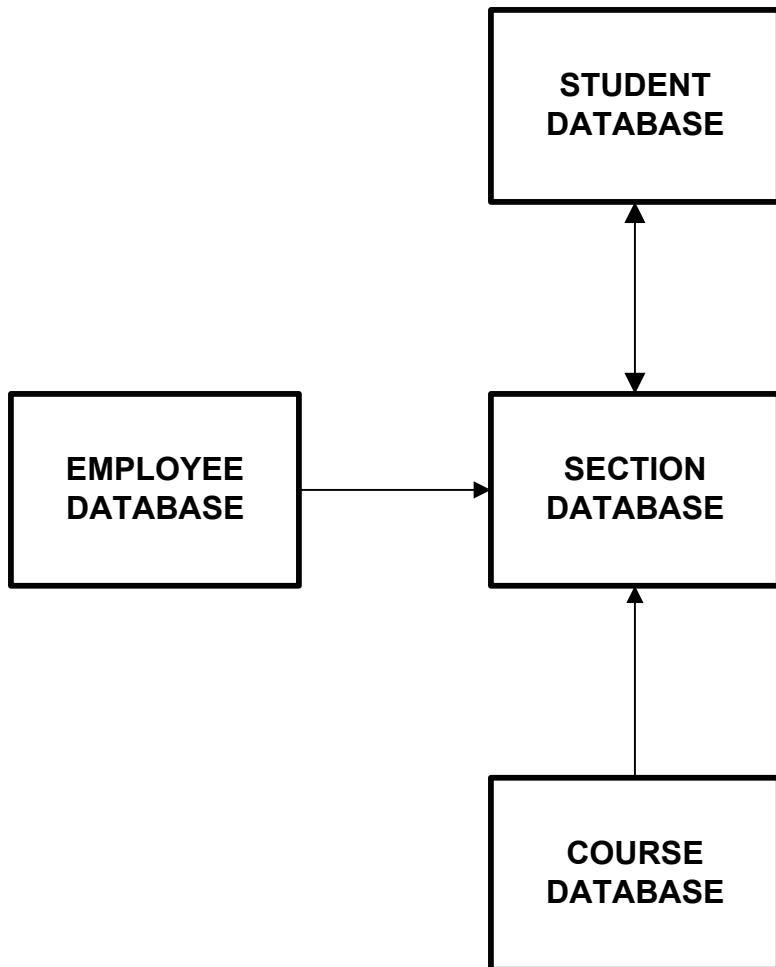
DATABASE DESIGN

PARTIAL DATABASE STRUCTURE: Focal Position of the SECTION DATABASE

Two things may be noted about the data structure as illustrated on this and the following page:

First, the focus of the database structure is the SECTION DATABASE to which the COURSE, EMPLOYEE, and STUDENT DATABASES are directly joined. This reflects the central role in an educational institution played by a section: It is the offering of a course by an instructor to a group of students.

```
                    ┌─────────────────┐
                    │     STUDENT     │
                    │    DATABASE     │
                    └─────────────────┘
                             ↕
┌─────────────────┐ ┌─────────────────┐
│    EMPLOYEE     │→│     SECTION     │→
│    DATABASE     │ │    DATABASE     │
└─────────────────┘ └─────────────────┘
                             ↑
                    ┌─────────────────┐
                    │     COURSE      │
                    │    DATABASE     │
                    └─────────────────┘
```

DATABASE DESIGN

Second, the relation between the STUDENT, ENROLLMENT, SECTION, and COURSE DATABASES reflect the connection between the courses in which the student enrolls.

```
┌─────────────────┐
│    STUDENT      │
│   DATABASE      │
└─────────────────┘
        ↕
┌─────────────────┐
│   ENROLLMENT    │
│   DATABASE      │
└─────────────────┘
        ↑
┌─────────────────┐
│    SECTION      │
│   DATABASE      │
└─────────────────┘
        ↕
┌─────────────────┐
│    COURSE       │
│   DATABASE      │
└─────────────────┘
```
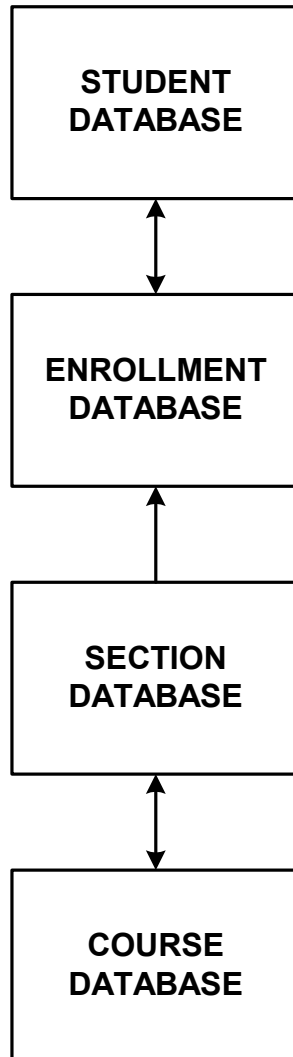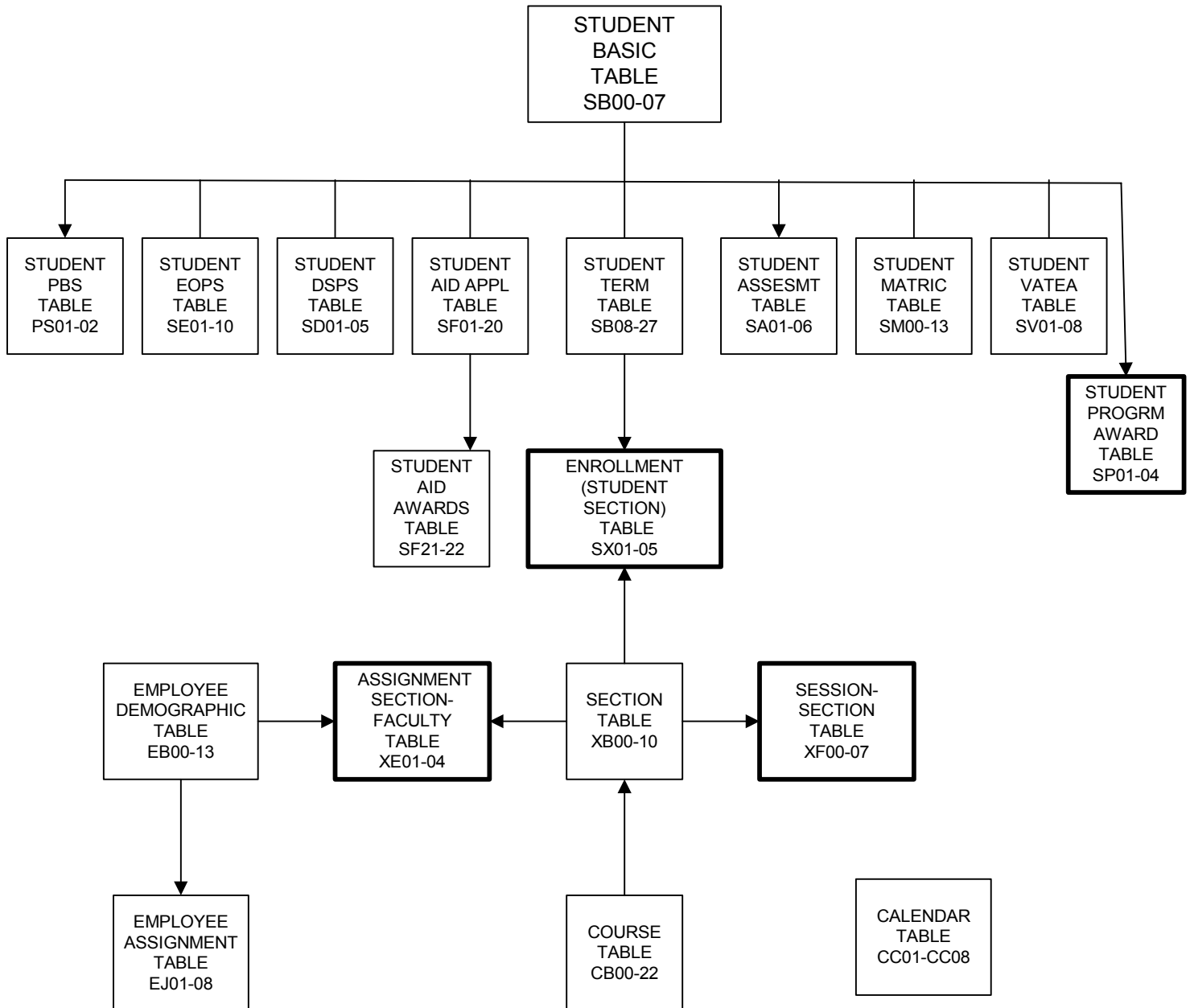
On the following pages the individual tables which make up the various databases are illustrated. Two of these tables serve the function of integrating the overall database structure; they act as the structural "glue." These interconnecting tables are:

1. The ASSIGNMENT table. This table links the Employee and Section databases.
2. The ENROLLMENT table. This table links the Section and Student databases,

On the subsequent pages, the data elements associated with each table are listed.
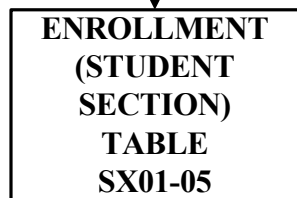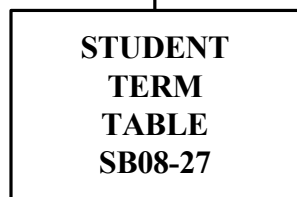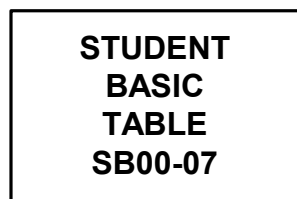
DATABASE DESIGN

DATABASE TABLES

```
                              ┌──────────────┐
                              │   STUDENT    │
                              │    BASIC     │
                              │    TABLE     │
                              │   SB00-07    │
                              └──────────────┘
```

| STUDENT PBS TABLE PS01-02 | STUDENT EOPS TABLE SE01-10 | STUDENT DSPS TABLE SD01-05 | STUDENT AID APPL TABLE SF01-20 | STUDENT TERM TABLE SB08-27 | STUDENT ASSESMT TABLE SA01-06 | STUDENT MATRIC TABLE SM00-13 | STUDENT VATEA TABLE SV01-08 |

STUDENT PROGRM AWARD TABLE SP01-04

STUDENT AID AWARDS TABLE SF21-22

ENROLLMENT (STUDENT SECTION) TABLE SX01-05

EMPLOYEE DEMOGRAPHIC TABLE EB00-13

ASSIGNMENT SECTION-FACULTY TABLE XE01-04

SECTION TABLE XB00-10

SESSION-SECTION TABLE XF00-07

EMPLOYEE ASSIGNMENT TABLE EJ01-08

COURSE TABLE CB00-22

CALENDAR TABLE CC01-CC08

DATABASE DESIGN

STUDENT DATABASE: Part one: BASIC, TERM, and ENROLLMENT DATA

TABLE   DATA ELEMENTS

**STUDENT
BASIC
TABLE
SB00-07**

Student-Basic
GI01   District-College-Identifier*
SB00   Student-Identifier*
SB01   Identifier-Status
SB02   Name-Partial
SB03   Birth-Date

SB04 Gender
SB05 Ethnicity
SB06 Citizenship
SB07 Primary Lang (Deleted)

**STUDENT
TERM
TABLE
SB08-27**

Student-Term
GI01   District-College-Identifier*
GI03   Term-Identifier*
SB00   Identifier*
SB02   Name-Partial
SB08   Zip-Code
SB09   Residence-Code
SB10   Employ-Exp (Deleted)
SB11   Education-Status
SB12   High-School-Last
SB13   College-Last (Deleted)
SB14   Educational-Goal
SB15   Enrollment-Status
SB16   Units-Earned-Local
SB17   Units-Earned-Transfer
SB18   Units-Attempted-Local
SB19   Units-Attempted-Transfer

SB20 Grade-Points-Local
SB21 Grade-Total Points-
        Transfer
SB22 Academic-Standing
SB23 Apprenticeship-Status
SB24 Transfer-Center-Status
SB25 Gain-Status (Deleted)
SB26 JTPA-Status
SB27 CalWORKs-Status

**ENROLLMENT
(STUDENT
SECTION)
TABLE
SX01-05**

Enrollment
GI01 District-College-Identifier*
GI03 Term-Identifier*
SB00 Identifier*
SB02 Name-Partial
CB01 Course-Dept-Number*
XB00 Section-Identifier*

SX01 Enrollment-Effective-Date
SX02 Enrollment-Drop-Date
SX03 Enrollment-Units-Earned
SX04 Enrollment-Grade
SX05 Enrollment-Positive-Attendance

NOTE: These data elements belong to the table which links the Student and the Section databases, and so belong to both databases.

*Key Fields

DATABASE DESIGN

STUDENT DATABASE: Part Two: PROGRAM AWARDS, DSPS, BASIC SKILLS, and EOPS

<u>TABLE</u>   <u>DATA ELEMENTS</u>

STUDENT PROGRAM AWARD TABLE SP01-04	**Student Program Award**		
	GI01	**District-College-Identifier***	SP02 Award
	GI03	**Term-Identifier***	SP03 Award-Date
	SB00	**Identifier***	SP04 Co-Unique-Code
	GI92	Record-Number-Identifier	
	SB02	Name-Partial	
	SP01	**Program-Identifier***	

STUDENT DSPS TABLE SD01-05	**Student-Disability**		
	GI01	**District-College-Identifier***	SD05 Disability-Dept-Rehab
	GI03	**Term-Identifier***	
	SB00	**Identifier***	
	SB02	Name-Partial	
	SD01	Primary-Disability	
	SD02	Primary-Disability-Services-Contacts	
	SD03	Secondary-Disability	
	SD04	Secondary-Disability-Service-Contacts	

STUDENT PRECOLLEGIATE BASIC SKILLS TABLE (PBS) PS01-02	**Student-Precollegiate-Basic-Skills**	
	GI01	**District-College-Identifier***
	GI03	**Term-Identifier***
	SB00	**Identifier***
	SB02	Name-Partial
	PS01	PBS Units-Accumulated
	PS02	PBS-Unit-Limit-Waiver-Status

STUDENT EOPS TABLE SE01-10	**Student-EOPS**		
	GI01	**District-College-Identifier***	SE06 Care-Term-Of-Accept
	GI03	**Term-Identifier***	SE07 Care-Marital-Status
	SB00	**Identifier***	SE08 Care-Num-of-Depend
	SB02	Name Partial	SE09 Care-TANF Duration
	SE01	Eligibility-Factor	SE10 EOPS/CARE Withd Rea
	SE02	Term-Of-Acceptance	
	SE03	End-Of-Term-EOPS-Status	
	SE04	Units-Planned	
	SE05	Care-Status	

*Key Fields

TABLE   DATA ELEMENTS

<div style="border:1px solid black">

**STUDENT
MATRIC
TABLE
SM01-13**

</div>

Student-Matriculation
  GI01   District-College-Identifier*
  GI03   Term-Identifier*
  SB00   Identifier*
  SB02   Name-Partial
  SM01   Goals
  SM02   Major
  SM03   Special-Services-Needs
  SM04   Orientation-Exempt-Status
  SM05   Assessment-Exempt-Status
  SM06   Counseling/Advisement-Exempt-Status
  SM07   Orientation-Services
  SM08   Assessment-Services-Placement
  SM09   Assessment-Services-Other
  SM10   Study-Skills-Evaluation-Servs (Deleted)
  SM11   Special-Services-Referral (Deleted)
  SM12   Counseling/Advisement-Services
  SM13   Academic-Follow-up-Services

Student-Assessment
  GI01   District-College-Identifier*   SA06 Raw-Score
  GI03   Term-Identifier*   (Deleted)
  SB00   Identifier*
  SB02   Name-Partial
  SA01   Instrument
  SA02   Assessment-Form (Deleted)
  SA03   Accommodation
  SA04   Purpose
  SA05   Date

<div style="border:1px solid black">

**STUDENT
ASSESSMENT
TABLE
SA01-06**

</div>

<div style="border:1px solid black">

**STUDENT
VTEA
TABLE
SV01-08**

</div>

Student-VTEA
  GI01   District-College-Identifier*   SV07 Criminal-Offender
  GI03   Term-Identifier*   Status (Deleted)
  SB00   Identifier*   SV08 Tech-Prep-Status
  SB02   Name-Partial
  SV01   Vocational-Program-Plan-Status
  SV02   Funded-Status (Deleted)
  SV03   Econ-Disadv-Status
  SV04   Single-Parent-Status
  SV05   Displaced-Homemaker-Status
  SV06   Coop-Work-Experience-Educational-Type

*Key Fields

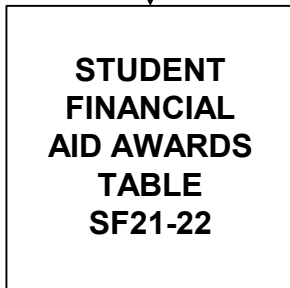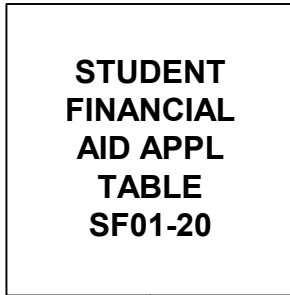----------------------------
LAST REVISION: 10/01/00

STUDENT DATABASE: Part Two Continued: FINANCIAL AID APPLICANT and AWARD

DATABASE DESIGN

TABLE   DATA ELEMENTS

```
┌─────────────────┐
│                 │
│     STUDENT     │
│    FINANCIAL    │
│   AID APPL      │
│    TABLE        │
│    SF01-20      │
│                 │
└─────────────────┘
         │
         │
         │
         │
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         ▼
┌─────────────────┐
│                 │
│     STUDENT     │
│    FINANCIAL    │
│   AID AWARDS    │
│    TABLE        │
│    SF21-22      │
│                 │
└─────────────────┘
```

Student-Financial-Aid-Applicant
    GI01 District-College-Identifier*
    GI03 Term-Identifier*
    SB00 Identifier*
    SB02 Name-Partial
    SF01 Applicant-Status
    SF02 Time-Period
    SF03 Budget-Category
    SF04 Total-Budget-Amount
    SF05 Dependency-Status
    SF06 Household-Size
    SF07 Family-Status
    SF08 Income-AGI-Parent
    SF09 Income-AGI-Student
    SF10 Untax-Inc-Parent
    SF11 Untax-Inc-Student
    SF12 TANF-Status (Deleted)
    SF13 Contrib-Parent (Deleted)
    SF14 Contrib-Student (Deleted)
    SF15 Other-Resources (Deleted)
    SF16 Gross-Fin-Need (Deleted)
    SF17 Pell-Grant-Index
    SF18 Vet-Benefits-Status (Deleted)
    SF19 Work-Study-Hours (Deleted)
    SF20 Campus-Employ-Amt.(Deleted)

Student-Financial-Aid-Award
    GI01 District-College-Identifier*
    GI03 Term-Identifier*
    SB00 Identifier*
    GI03 Term-Received
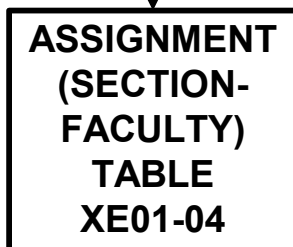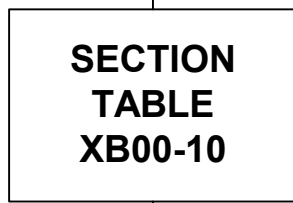   SF21 Award-Type
    SF22 Amount-Received

*Key Fields

LAST REVISION: 12/23/04

DATABASE DESIGN
SECTION DATABASE: SESSION, SECTION, and ASSIGNMENT

TABLES

DATA ELEMENTS

SESSION (SECTION) TABLE XF00-07

Session

GI01	**District-College-Identifier***	XF06 Meeting-Time-Ending
GI03	**Term-Identifier***	XF06 Meeting-Time-Ending
CB01	**Course-Dept-Number***	XF07 Total Hours
XB00	**Section-Identifier***	
XF00	**Session Identifier***	
XF01	Instruction-Method	
XF02	Date-Beginning	
XF03	Date-Ending	
XF04	Days-Scheduled	

SECTION TABLE XB00-10

Section

GI01	**District-College-Identifier***	XB03 Date-Census-Second (Deleted)
GI03	**Term-Identifier***	XB04 Contract-Education-Code
GI02	**District-College-Division***	XB05 Units-Maximum
CB01	**Course-Dept-Number***	XB06 Units-Minimum
XB00	**Section-Identifier***	XB07 VTEA-Funded-Status (Del)
XB01	Accounting-Method	XB08 DSPS-Special-Status
XB02	Date-Census-First	XB09 Wrk-Based-LearningActs
		XB10 CVU/CVC Status

ASSIGNMENT (SECTION-FACULTY) TABLE XE01-04

Faculty-Assignment

GI01	**District-College-Identifier***	XF00 Session-Identifier*
GI03	**Term-Identifier***	XE01 Type
CB01	**Course-Dept-Number***	XE02 Percent
XB00	**Section-Identifier***	XE03 FTE
EB00	**Employee-Identifier***	XE04 Hourly Rate

*Key Fields

COURSE DATABASE:

DATABASE DESIGN

TABLE

```
┌─────────────────────┐
│                     │
│      COURSE         │
│      TABLE          │
│     CB00-22         │
│                     │
└─────────────────────┘
```

DATA ELEMENTS

Course

GI01	**District-College-Identifier***
GI03	**Term-Identifier***
CB00	Permanent-District-Identifier (Deleted)
CB01	**Department-Number***
CB02	Title
CB03	Top-Code
CB04	Credit-Status
CB05	Transfer-Status
CB06	Units-Of-Credit-Maximum
CB07	Units-Of-Credit-Minimum
CB08	Basic-Skills-Status
CB09	SAM-Priority-Code
CB10	COOP-ED-Status
CB11	Classification-Code
CB12	Repeatability (Deleted)
CB13	Special-Class-Status
CB14	Can-Code
CB15	Can-Seq-Code
CB16	Same-As-Dept-Number 1 (Deleted)
CB17	Same-As-Dept-Number 2 (Deleted)
CB18	Same-As-Dept-Number 3 (Deleted)
CB19	Crosswalk-CRS-Dept-Name
CB20	Crosswalk-CRS-Number
CB21	Prior-to-College-Level
CB22	Noncredit-Category

*Key Fields

LAST REVISION: 10/01/00

DATABASE DESIGN

TABLE	DATA ELEMENTS
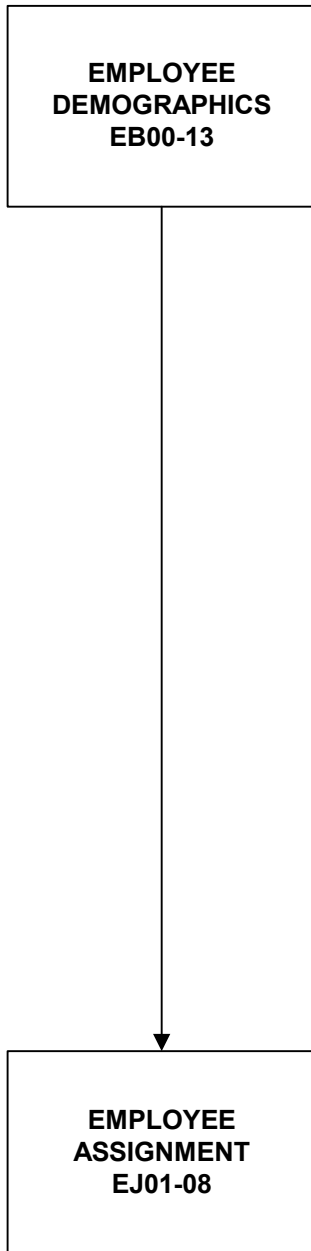
Employee-Demographics

GI01	**District-College-Identifier***
GI03	**Term-Identifier***
EB00	**Identifier***
EB01	Identifier-Status
EB02	Birth-Date
EB03	Gender
EB04	Ethnicity
EB05	Citizenship
EB06	Disability-Status
EB07	EEO6-Occupational-Activity
EB08	Employment-Classification
EB09	Employment-Status
EB10	Date-of-Employment
EB11	Employment-Contract-Duration
EB12	Annual-Salary
EB13	Annual-Stipend
EB14	**DO NOT IMPLEMENT**

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┌─────────────────┐
│                 │
│   EMPLOYEE       │
│ DEMOGRAPHICS     │
│   EB00-13        │
│                 │
└─────────────────┘
        │
        │
        │
        ▼
┌─────────────────┐
│                 │
│   EMPLOYEE       │
│ ASSIGNMENT       │
│   EJ01-08        │
│                 │
└─────────────────┘
```

Employee-Assignments

GI01	**District-College-Identifier***
GI03	**Term-Identifier***
EB00	**Employee-Identifier***
EJ01	Type
EJ02	Leave-Status
EJ03	**Account-Code***
EJ04	Weekly-Hours
EJ05	Hourly-Rate
EJ06	Total-Annual-Hours
EJ07	Total-Payment
EJ08	FTE

*Key Fields

LAST REVISION: 01/01/02

DATABASE DESIGN
RATIONALE FOR DATA ELEMENT CODE VALUES

A.   <u>Objectives for Data Element coding scheme:</u>

•   Ensure consistency in coding all data elements;
•   Provide rules which will act as a set of principles to guide the designer when creating a new set of codes for a new data element;
•   Allow the user to apply rules that are "easy" to remember when interpreting data generated from ad-hoc queries;
•   Develop a reporting system that is based on <u>Positive Reporting</u>**.**

<u>Positive Reporting</u> is founded on the principle of requiring a valid response for all data elements (i.e., blanks and spaces are not valid values).   This is to ensure that no data element is omitted

B.   <u>Data Element Classifications:</u>

The data elements defined in the Data Element Dictionary fall into three classes of data: Alphanumeric, Numeric, and Dates.

• <u>Alphanumeric:</u>

•Numeric Codes (0-9):

This coding scheme implies an ordering or ranking of codes. This implied ordering orranking can occur for two reasons. First, the items of a data element may have a logical order or rank associated with them. In addition, numeric codes are used where there is a preferred ordering or ranking of data items on the input source documents or the output terminal displays and paper reports.

•Alpha Codes (A-Z):

There are three reasons for using alpha codes. First, if there are more than ten categories of data items and there are requirements to limit the size of the data element to one character, alpha codes may be used to accomplish this.   Second, where it seems appropriate, alpha codes may be used to embed some intelligence into the data items. For example, data items for Student Gender (see SB04) are coded "F" for "Female" and "M" for "Male". And third, where it is desirable to code data items with no order or intelligence, alpha codes may be sequentially assigned for this purpose.

•Period (.):

A period (.) as part of a code acts as a place holder. This coding scheme is used to follow the principle of Positive Reporting.

DATABASE DESIGN

- Numeric:
  - Not to be confused with Numeric Codes (above), numeric data elements contain numeric values that will be used in some arithmetic calculations.

- Dates:
  - Date data elements represent valid dates in the format YYMMDD, where YY = Year, MM = Month, and DD = Day. The birthdate has been changed to YYYYMMDD, where YYYY = Year, MM = Month, and DD = Day. The Chancellor's Office will determine the century. The day must be within a range valid for that month. Also, leap year must be considered when reporting for February (i.e., 28 or 29 days).

C.   Defaults:

There are circumstances or conditions that require the use of a default value when the coding of a data element is unknown or not applicable. (Note: Some data elements do not allow default values. Refer to the Data Element Dictionary to determine if a default value may be applied to a particular data element.)

The conditions that can occur in which default values are used.

- Unknown and Unreported: This occurs when the value for a particular data element is unknown because it could not be captured from the data source (i.e., a student did not fill out a survey item). Thus, the value for the data element is unknown and unreported.

- Not Applicable: This occurs when there are two data elements that can be reported for the same entity, and depending on their values, only one of those data elements is applicable, but not both. Data Elements that fall into this classification are said to be mutually exclusive of one another. That is, if a data element is reported so that it negates the application of another data element, they are said to be mutually exclusive.

  For example, if a student drops a course, then the Enrollment Drop Date is coded with the appropriate date. If the student does not drop the course, the Enrollment Drop Date has no meaning for that Student Enrollment. Therefore, the Enrollment Drop Date would be coded as "Not Applicable." (i.e., "888888" since it is a date field.)

DATABASE DESIGN

Default Codes:

The following table specifies the coding scheme that is used to represent each of the above default conditions for each data classification.

Codes Reported by Districts

Data Class	Not Applicable	Unknown Unreported
Alphanumeric	Y	X
Numeric	8	9
Dates	8	9

D.   General Guidelines for Coding the Unused portion of a Data Element:

These are general guidelines that are to be followed when developing applications that will generate codes or values for each data classification.

- Alphanumeric: Unless otherwise specified, these data elements should be left-justified with trailing blanks. NOTE: Some data element definitions call for other literals to be inserted in unused portions instead of blanks and also call for right-justification. See the data element dictionary for actual coding specifications.

- Numeric: Right-justified, decimal aligned with leading zeros before the first significant digit.

- Dates: Date fields are six-digits in the format of YYMMDD, where YY = Year, MM = Month, and DD = Day. The birthdate has been changed to YYYYMMDD, where YYYY = Year, MM = Month, and DD = Day. The Chancellor's Office will determine the century.   The date should completely fill the field. If coding a date that has a month or day that is only one digit, insert a leading zero, i.e., January 1, 1988 would be coded as "880101".