

A Excel Based Software Solution for Administrative and Educational Tasks

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Abstract: *This article describes the development and implementation of a comprehensive computer program designed to reduce the administrative workload and prepare reports by the perpetual controller for submission to college administration. The paper emphasizes the great burden that falls on the administration conferences. The developed program provides, provides reports that are easy, accurate, and efficient. The researcher relied on Excel techniques and used many advanced Excel functions to manage data and create error-free reports. The article discusses the program's input and output mechanisms, its security features, and its practical application at Qassim University, highlighting its effectiveness in simplifying administrative duties while enhancing report accuracy. to schedule lectures without conflicts, as well as to Select appropriate halls for lectures, public meetings, or conferences.*

Keywords: Excel database, higher education, student affairs, input and output models, dashboard

1. Introduction

The main mission of the college administration is to secure the requirements of the educational process and follow up on the smooth conduct of lectures in terms of the availability of teaching halls and the necessary equipment in the computer laboratories, the competence of the administrative and scientific faculty members, and adherence to the established plans and methodologies.

For this reason, there must be daily reports describing the educational and administrative situation in the college in terms of members' commitment to giving lectures or being present in the offices to receive students during office hours during the day. Also, preparing reports on vacant and occupied halls at the times of holding busy lectures and knowing periods of student density.

Preparing the aforementioned reports requires the employee in charge of doing so to expend more effort and time, and he must have competence, experience, and vigilance to accomplish what is required. Even if he has sufficient experience to complete reports, it will take a long time, and yet he may unintentionally make mathematical errors, unless he uses computer technology. For this reason, this program was prepared for use in scientific institutions, colleges, and institutes by the administrative staff working in them, with the aim of speed in completion and accuracy in calculations and performance.

After completing the correction process, transferring or recording students' grades, and taking the necessary samples. It requires him to expend more effort and time to obtain statements, reports, and statistics. This requires reasonable experience in the principles of statistics, and this experience may not be available. Especially if his specialty is in the literary field. Even if he has sufficient experience to complete

reports, he will need a long time and may unintentionally make mathematical errors. This is why I prepared this program for use by faculty and administration members with the aim of speed in completion and accuracy in calculations and performance.

The most important reports generated by the program:

- 1) Faculty members' weekly lecture schedules.
- 2) Weekly lecture schedules for faculty members, categorized by department and gender.
- 3) Compiled weekly lecture schedules for course sections (groups) by department.
- 4) Weekly lecture schedules for courses at each academic level within the college.
- 5) A list of vacant and occupied halls, categorized by gender, day, and lecture period.
- 6) A list of faculty members delivering lectures, organized by day and period.
- 7) A list of faculty members presents in offices for office hours, organized by day and period.
- 8) A list of administrative or organizational violations that may be committed by faculty members or administrative employees, such as absence, tardiness, or leaving before the end of a lecture period or before completing assigned duties.

2. Problem Statement

With the increasing burdens and tasks of assigned administrative employees, and based on the college administration's need for reports to be prepared by these employees in a timely manner, it was necessary to use computer technology to complete those necessary reports, tables, and lists on time.

It is known that to complete any report, no matter how simple, we may commit some unintended errors, especially if

the completion process does not rely on a computer. If we take a sample of reports completed manually in a college, we will find many mathematical and expressive errors, in addition to the existence of fundamental differences in coordination and format between reports of the same type, which are supposed to be unified.

The reports submitted by employees in colleges or even in other institutions were and still are on paper or perhaps using the Microsoft Word text editor, depending on the efficiency of the employees, which is rarely available and all the calculations they need are performed manually, meaning that the required accuracy in the numbers, values, or calculated ratios is not available.

The software that we provide requires the use of electronic databases as a primary source for extracting reports, and according to the design of the program and the aforementioned reports, the databases that we will need include: faculty members, academic courses, classrooms available in the college and their equipment, and finally a special database of groups for each course that is generated according to the number of registered students.

3. Advantages of Microsoft Excel

It is one of the most important Microsoft programs. It contains a large number of mathematical, statistical, financial, logical, and database management functions... We are not going to mention the advantages of the Excel program here, because that is not the goal of the research paper that we are presenting, but we will mention some of the techniques and functions that the researcher used in designing this program.

- 1) A technology that restricts program access to authorized users only.
- 2) A technique has been implemented to disable the program on a date specified by the designer.
- 3) Strong security keys have been put in place to prevent errors during data entry.
- 4) Hyperlink technology has been used to navigate between program components.
- 5) Auxiliary fields have been created using the "CONCATENATE" function and the ampersand "&" to implement database functions.
- 6) The "INDEX", "MATCH", and "VLOOKUP" functions have been used in the database to generate the required reports.
- 7) The "INDIRECT" and "OFFSET" functions have been applied in validation criteria settings to enable data selection from main or sub-drop-down lists.
- 8) Formulas with multiple conditions have been used in combination with conditional formatting settings.

This software consists of several worksheets, some of which are inputs and others are outputs, linked together by software codes, so that they form an integrated system for processing data and obtaining the necessary reports. In addition to a main interface with many keys, which allow the user to move between the program components. These keys are cells hyperlinked to inputs and outputs, so that the user controls the program components through that screen. The following figure (1) is a Dashboard of the main interface of the program:

جامعة القصيم كلية الأعمال والاقتصاد		وحدة شؤون الطلاب				١٤٤٦ هـ	
أعضاء هيئة التدريس	القاعات المشغولة	مقررات القسم	6	القاعات الشاغرة	62	المقررات الدراسية	
توزيع المقررات	الجدول الأسبوعي	أعضاء القسم	11	الجدول المجمع	25	توزيع المحاضرات	
مخطط العيب	نظم المعلومات / الساليب كمية	الأحد	08:00-09:15	ميلادي	10	العيب التدريسي	عبدالمجيد علي بلکش 10.00
مخطط المقررات	نكر	استاذ مشارك	الاربع	المقر الرئيسي	1447/144٤	تحضير اختبار	1447/144٤
مخطط الأعضاء	STAT124-M7	احض ١٢٤	الاربع	الاختبار الفصلي	التقي	مخطط المقررات	
١٦:٤٢ / الجمعة - ٠٨ / شعبان / ١٤٤٦		16:42/Friday-21/02-February/2025					

Figure 1: "main screen"

The green-colored keys on the screen are designated for opening input tables. While the yellow-colored keys are for opening outputs such as tables, statements, and reports.

4. Input and Output

The worksheets in the program are divided into two main groups of worksheets: the input group and the output group.

4.1. First - set of inputs:

- 1) The college database, which includes college departments, lecture halls, lecture times, and other relevant information.
- 2) The course schedule, which contains all details related to the courses.
- 3) The faculty members table, which includes all data related to faculty members.
- 4) The schedule for assigning courses and divisions to faculty members.
- 5) The schedule for distributing lectures, including their locations and times.

4.2. Second - Set of Outputs:

We It includes tables or reports, some of which require entering data into the input boxes on the screen, and some of which also require executing a filter command to show the records corresponding to the entered data, including:

- 1) The college database, which includes college departments, lecture halls, lecture times, and other relevant information.
- 2) The course schedule, which contains all details related to the courses.
- 3) The faculty members table, which includes all data related to faculty members.
- 4) The schedule for assigning courses and divisions to faculty members.
- 5) The schedule for distributing lectures, including their locations and times.

The following figure represents the program outline:

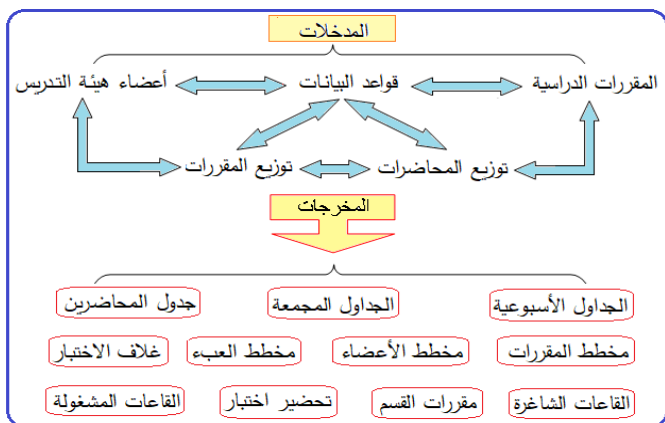


Figure 2: "box diagram of inputs and outputs"

The types of relationships that were used in designing the program are:

- 1) One-to-many relationship $1 \rightarrow \infty$.
- 2) A many-to-many relationship $\infty \rightarrow \infty$.

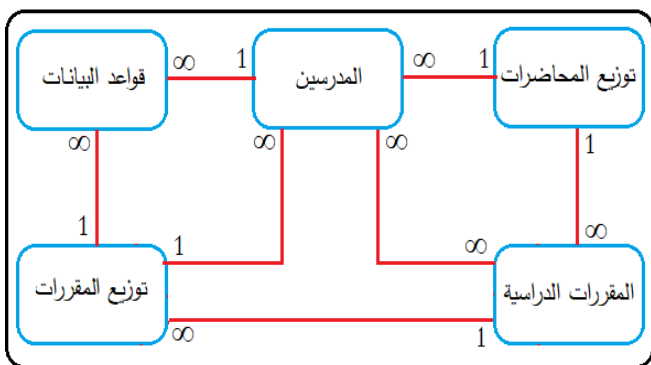


Figure 3: "Types of relationships used"

5. An overview of the internal system applied at the university

Each institution has its own laws and internal regulations that everyone who works or belongs to it adheres to. The internal system at Qassim University, as in all Saudi universities or even public institutions and departments, is affected by customs and traditions. It can be summarized in the following points.

5.1. Bylaws

- 1) The college is divided into two sections, each with its separate building: one for female students and the other for male students. (Students are not permitted to mix; male students are not allowed to enter the female students' building).
- 2) Students enrolled in any course are divided into groups based on gender. Male students are placed in one group, while female students are placed in separate groups. Each group has a maximum limit of 50 students, except for certain theoretical courses that are typically offered online.
- 3) Each course has one designated teacher as the coordinator responsible for distributing the methodology throughout the academic weeks and ensuring the smooth operation of the teaching process of the course.

- 4) Female teachers are not permitted to be assigned to deliver lectures in the male section, while male teachers may be permitted to deliver lectures online in the female section, but not in person.
- 5) It is not permissible to assign female teachers to proctor exams in the male section, also it is not permissible to assign male teachers to proctor exams in the female section.
- 6) Male teachers can conduct joint lectures for female students online while simultaneously delivering the same lecture in person to male students. This allows for the same content to be presented to both groups, with male students attending in person and female students participating remotely.

5.2. The aforementioned conditions related to giving lectures require teaching halls that have specific specifications, which we mention below:

- 1) Halls located in the male section equipped with a microphone and camera to transmit sound and images to the female section and communicate with them.
- 2) Halls located in the female section equipped with a microphone and a screen to receive an image of the blackboard from the male section and communicate with them.
- 3) Halls equipped only with a projector to display the computer screen on the blackboard.
- 4) Halls equipped with computers dedicated to training students on using computers.
- 5) Halls equipped with equipment and raw materials to conduct and implement scientific experiments in various fields.
- 6) regular halls that are not equipped with any of the previously mentioned equipment.

6. Program design

The program was designed so as not to conflict with the university's internal system. Based on that and in implementation of the instructions contained in the system, the two researchers used data validation rules in different ways, taking advantage of the "Offset" and "Indirect" functions when using the "Data Validation" rule to obtain main and sub-dynamic ranges.

Additionally, researchers simultaneously designed conditional formats based on formulas and equations using several functions, such as "Or," "And," "If," "Count," and "Count if."

Generally, data validation rules and conditional formatting are used in input and output tables to ensure the validity of the input data and thus the validity of the output tables and reports. Below we will explain some of these rules and formats.

تسلسل	رمز الشعبة	رمز المقرر	أستاذ المقرر	أستاذ التدريس	الجنس	رقم الشعبة	وضع القاعدة
1	STAT124-M1	احص ١٢٤	يوسف سالم عياد الحزبي	يوسف سالم عياد الحزبي	طلاب	3427	
2	STAT124-M2	احص ١٢٤	أشرف حسن إدريس بريمة	منصور عباس	طلاب	3429	
3	STAT124-M3	احص ١٢٤	أيمنه جينان الحيدان	نما صالح الطيب	طلاب	3431	
4	STAT124-M4	احص ١٢٤	عبدالمجيد علي بلکش	عبدالمجيد علي بلکش	طلاب	3433	
5	STAT124-M5	احص ١٢٤	عادل موسى وانس	منصور عباس	طلاب	3435	
6	STAT124-M6	احص ١٢٤	يوسف سالم عياد الحزبي	عبدالمجيد علي بلکش	طلاب	3437	
7	STAT124-F1	احص ١٢٤	هالة محمود أبو الليل	هالة محمود أبو الليل	طليات	2900	
8	STAT124-F2	احص ١٢٤	خامسي محمد صعغولي	ارنا عبدالمعظم الطيب	طليات	2902	

Figure 4: Input table “Distribution of Courses”

Note that the name in the group “3431” in the Course Professor field is red because the system does not allow females to give lectures in the section for male students. Precise standards have also been established to ensure correct data entry in all input tables.

In addition to custom conditional formats that rely on formulas and equations, including the inability to repeat the group number, the inability to enter a date that falls on a holiday, the inability to choose a hall that does not accommodate the group’s students... Such conditional formats help the user to ensure that the inputs are correct.

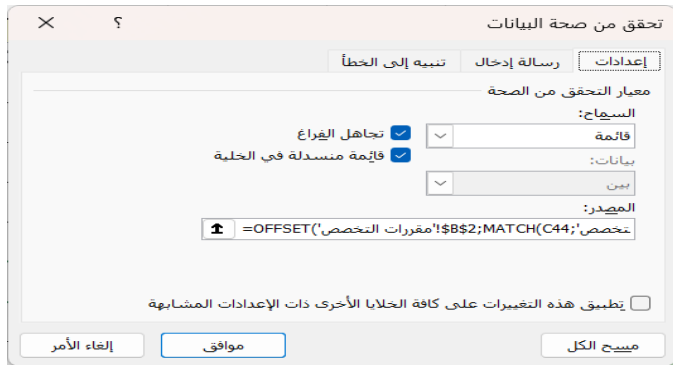


Figure 5: “Data validation rule for a subrange linked to a dynamic primary data range”

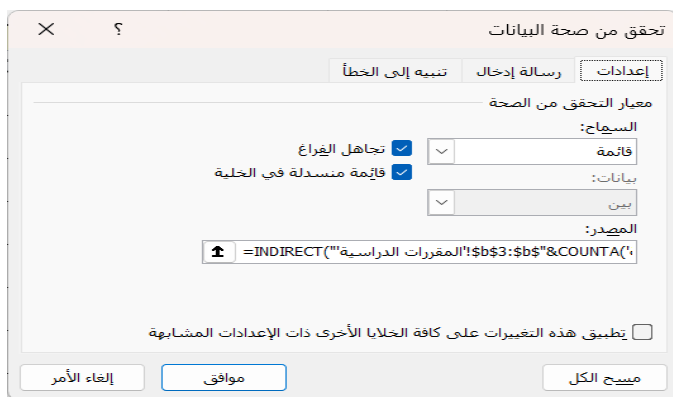


Figure 6: “Data validation rule for a basic dynamic range”

The figure below is the dialog window for conditional formatting applied to the input table so that it indicates in red when the input is wrong:

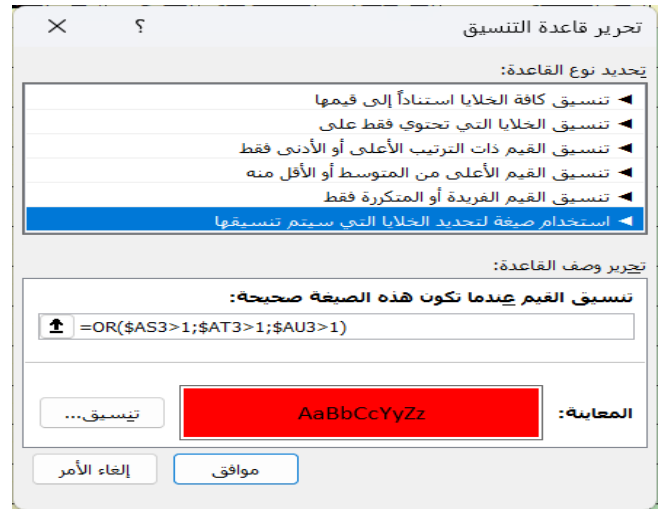


Figure 7: “Conditional formatting”

Also, Figure (7) is the dialog window for the data validation rule related to the course distribution input table, so it indicates in red when the entry is wrong.

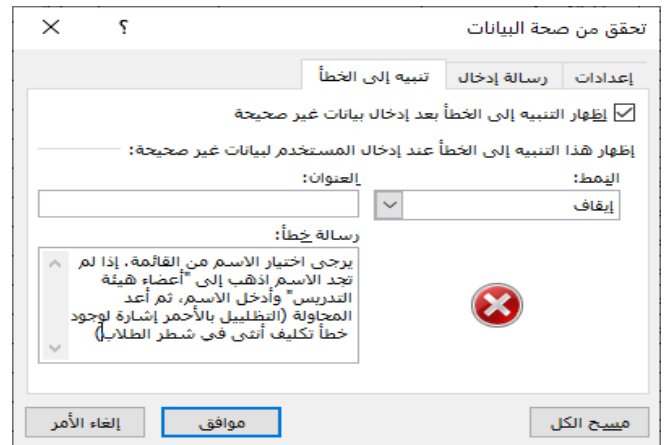


Figure 8: “Error message for data validation rule”

تسلسل	أستاذ المقرر	اليوم	التوقيت	النشاط	القاعة	رقم الشعبة	النوع	رمز المقرر
1973	نسرين محمود خليفي	الاثنين	01:15-02:30	نظري		MIS362-F1	طالبات	نما ٣٦٢
1974	نسرين محمود خليفي	الثلاثاء	01:15-02:30	نظري		MIS362-F1	طالبات	نما ٣٦٢
1975	نسرين محمود خليفي	الاثنين	10:50-11:40	عملي		MIS362-F1	طالبات	نما ٣٦٢
1976	جلال الدين عثمان	الأربعاء	10:00-11:40	نظري	203	MIS364-M1	طلاب	نما ٣٦٤
1977	جلال الدين عثمان	الخميس	09:25-10:40	نظري	202	MIS364-M1	طلاب	نما ٣٦٤
1978	جلال الدين عثمان	الأربعاء	10:50-11:40	عملي	203	MIS364-M1	طلاب	نما ٣٦٤
1979	سجاح حسين الزاوي	الأربعاء	09:25-10:40	نظري		MIS364-F1	طالبات	نما ٣٦٤
1980	سجاح حسين الزاوي	الخميس	09:25-10:40	نظري		MIS364-F1	طالبات	نما ٣٦٤
		الأربعاء	10:50-11:40	عملي				

Figure 9: Input table “Distribution of lectures and halls”

It is clear from Figure (9) that the course “MIS364” is shaded in red because the second section of the female section requires a third lecture, and the course symbol is shaded in red because there is a section whose lectures are not scheduled yet. We also note that the teacher's name, "Jalal," is shaded in red due to an error in assigning him two lectures at the same time. Such controls and standards prevent the entry of any wrong value, which helps the user to produce completely error-free reports.

The program was used during the second semester of the year 2025 by the administration of the College of Economics

and Administration at Qassim University to verify the validity of the outputs so that it meets the administration’s need to follow up and monitor the progress of lectures and the teaching process, and by benefiting from the administration’s observations and suggestions, the final version of the program was reached.

7. How does the program work

The program operates through several steps. First, we input the data into the designated tables. Next, we enter specific statements into the input boxes, such as department number, teacher name, and department name. Once this is done, all outputs—including tables, reports, and statements—will be generated. We have summarized the mechanism of action in the following points:

- 1) First, we enter the data into the input tables, including the courses table, faculty table, and database tables.
- 2) Second, we assign courses and sections to teachers based on the number of students registered in each course.
- 3) Third, we schedule the lectures according to the days and times they will be held and allocate appropriate halls based on their capacity and equipment.
- 4) Finally, we set the dates and times for examinations for each course and each group, as well as allocated halls and proctors for the exams.

Once we have completed the previous steps, we can enter any statement—such as department number, course code, teacher name, department name, or level—into the input boxes on the main screen. All outputs, including tables, reports, and statements, will be generated accordingly. Additionally, any report can be automatically modified through the input boxes on the main screen if needed.

We will present some of the outputs that can be obtained from the program, which are consistent with the data for the first semester 462 of the academic year 1446 AH.

- 1) From the main screen, we click on the “occupied halls” key, so we get a table of the number and percentage of occupied halls on all days of the week and for all periods in which lectures are given, as shown in Figure (10).

عدد ونسبة القاعات المشغولة حسب اليوم والفترة لشطر الطلاب

الأيام	الفترة الأولى		الفترة الثانية		الفترة الثالثة		الفترة الرابعة		الفترة الخامسة	
	العدد	النسبة	العدد	النسبة	العدد	النسبة	العدد	النسبة	العدد	النسبة
الأحد	24	31 %	34	44 %	5	6 %	31	40 %	19	24 %
الاثنين	29	37 %	37	47 %	3	4 %	33	42 %	24	31 %
الثلاثاء	31	40 %	35	45 %	4	5 %	5	6 %	24	31 %
الأربعاء	35	45 %	34	44 %	10	13 %	21	27 %	18	23 %
الخميس	24	31 %	21	27 %	13	17 %	18	23 %	14	18 %

Figure (10) “Table of the number and percentage of occupied halls”

- 2) From the main screen, we choose the day and period. We click on the “Vacant Halls” key, so we get a table of all the vacant halls in both parts of the college. Male halls can be distinguished from female halls by color.

The green color is for male students and the pink color is for female students, as shown in Figure (11).

The hall will remain shaded as long as there is no lecture in it, and when it is busy with the lecture, the shading disappears, and the halls for the male section are marked in green, and those shaded in pink for female students, while the yellow color is designated for joint lectures.

القاعات المظلة هي القاعات الشاغرة ليوم الأحد في الفترة ٠٩:١٥-٠٨:٠٠

القاعة	السعة	القسم	القاعة	السعة	القسم	القاعة	السعة	القسم	القاعة	السعة	القسم
VCR1	25	مشتركة	201	40	طلاب	208	45	طلاب	201	25	مشتركة
VCR2	25	مشتركة	202	30	طلاب	209	50	طلاب	202	25	مشتركة
VCR3	25	مشتركة	202	40	طلاب	210	40	طلاب	202	25	مشتركة
5176	50	طلاب	202	40	طلاب	211	60	طلاب	202	50	طلاب
5177	50	طلاب	202	40	طلاب	212	40	طلاب	202	50	طلاب
101	50	طلاب	202	40	طلاب	213	40	طلاب	202	50	طلاب
102	50	طلاب	202	40	طلاب	214	60	طلاب	202	50	طلاب
103	50	طلاب	203	40	طلاب	215	50	طلاب	203	50	طلاب
201	50	طلاب	204	25	Lab4	204	50	طلاب	204	50	طلاب
201	40	طلاب	204	50	طالبات	1313	40	طلاب	204	40	طلاب
201	60	طلاب	204	80	طالبات	2017	60	طلاب	204	60	طلاب
201	40	طلاب	204	70	طالبات	2020	40	طلاب	204	40	طلاب

Figure (11) “Table of vacant and occupied halls by day and period”

- 3) From the main screen, we click on the “Weekly Schedules” key, so we get the schedules of all members of the department, and we will display only one of them, as shown in Figure (12). main screen.

الأيام	07:00-10:00	03:00-04:15	01:15-02:30	11:45-01:00	10:50-11:40	09:25-10:40	08:00-09:15
الأحد	الفترة المسائية	الفترة المسائية	الفترة الخامسة	الفترة الرابعة	الفترة الثالثة	الفترة الثانية	الفترة الأولى
الاثنين				مراجعة ساعة متبينة			مراجعة ساعة متبينة
الثلاثاء					مراجعة ساعة متبينة	مراجعة ساعة متبينة	مراجعة ساعة متبينة
الأربعاء						مراجعة ساعة متبينة	مراجعة ساعة متبينة
الخميس				مراجعة ساعة متبينة			مراجعة ساعة متبينة

Figure 12: “A faculty member's lecture schedule”

It is clear from this table (12) that the teaching load of the teacher and he has 6 lectures, including two joint lectures (given simultaneously) for male students in person and female students remotely, shaded in yellow. He is also assigned two lectures in the female section, which he delivers remotely from the male section, shaded in pink. He also has two lectures in the male student's section without shadowing, in addition to five office hours. Highlighting female lectures or joint lectures will work according to the conditions used in the conditional formatting. It will change once you choose any other teacher's name.

- 4) From the main screen, we select the department, click on the “Group Tables” key, so we get detailed tables for all

the department’s courses and groups, and we will display only one page of the report, as shown in Figure (13).

الجدول الدراسية لأعضاء هيئة التدريس بقسم: التأمين للفصل الدراسي (٢٠٢٢) 2

تسلسل	الشعبة	رؤس المقرر	اسم المقرر	النشاط	مدارس المقرر	ضم	اليوم	الوقت	القاعة	الجنس	متطلبات سابقة
1	2649	فان ٢٥١	التأمين وإدارة المخاطر	نظري	مكرم عبدالمجيد بالجيد		الاثنين	05:30-06:45	05:30-06:45	طلاب	٢٣٠
2	2650			نظري			الاثنين	05:30-06:45	05:30-06:45	طلاب	
3	1209			نظري	انتهال عبدالعزيز العوده		الاثنين	05:30-06:45	05:30-06:45	طالبات	
4	1214			نظري	برزة عبدالله الجديبي		الاثنين	05:30-06:45	05:30-06:45	طالبات	
5	172-1			نظري	نورة صليمان الحري		الاثنين	05:30-06:45	05:30-06:45	طالبات	
							الاثنين	05:30-06:45	05:30-06:45		

ملاحظة: السجلات المظلمة خاصة بالشعب والمقررات في فرع الوس
رئيس القسم الدكتور: عبدالله إبراهيم العريني

Figure 13: “Detailed tables grouped by department”

5- From the main screen, we choose the teaching load chart and the student chart, so we get the following charts (14), (15):

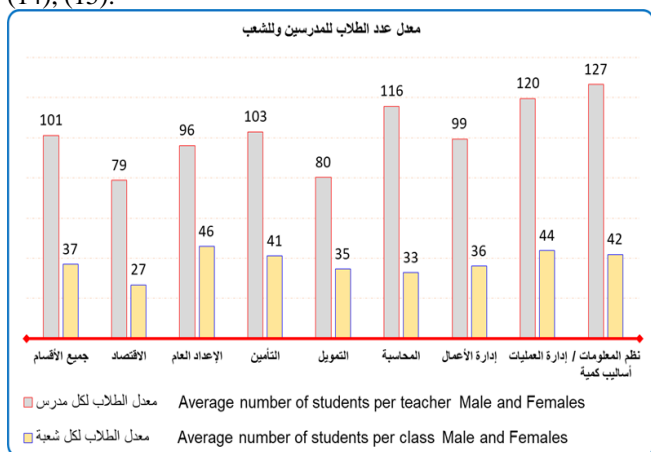


Figure 14: “Average student scores for each teacher and each group, categorized by department”

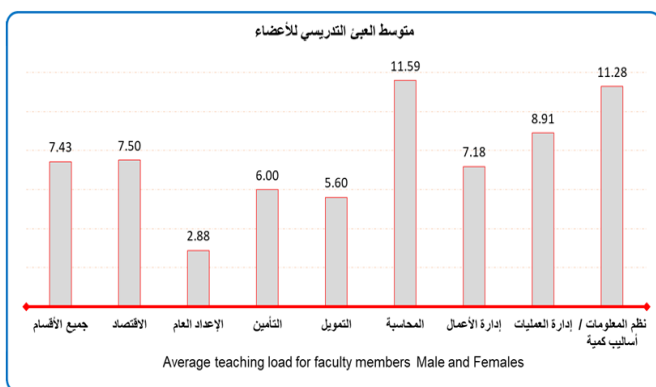


Figure 15: “Detailed tables grouped by department”

Any statement entered incorrectly in the input tables will appear highlighted in red in the output tables or reports. The employee using the program does not need any effort to prepare any of the mentioned reports, because the program will do that. He only has to choose the group number, open the report, then print it or save it in PDF format.

8. Conclusion

Utilizing programs and computer technologies to prepare the daily statements and reports that the college administration needs to monitor the smooth running of the teaching process means quick completion, saving effort and time, and without errors. Therefore, we offer this program as an alternative to manual work for college administrations in institutes, universities, or higher educational institutions to accomplish the following:

- 1) Weekly schedules for faculty members’ lectures.
- 2) Detailed tables collected for all college departments.
- 3) Weekly schedules for groups of all courses by levels.
- 4) Daily report on the progress of the teaching process shows attendance, absence, or tardiness to lectures.
- 5) A list to prepare students for lectures or exams.
- 6) Determine the appropriate day and time for holding and holding conferences so that it does not conflict with lecture schedules for faculty members.

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