

# ASSESSMENT GRADING SYSTEMS IN UNDERGRADUATE PROGRAMMES OF STUDY

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*ABSTRACT This paper reflects on recent developments in assessment grading systems and their adoption in undergraduate level modular study programmes at the University of Derby.*

*Universities and other higher education establishments are in the main providers at undergraduate level of study programmes at degree level and EDEXCEL (BTEC) higher national diplomas. The majority of these programmes are of modular design and for each module successfully studied a grade and credit in the form of points is awarded.*

Traditional marking using a scale of percentages is discussed in relation to the increased introduction of alphabetical grading systems in which there is considerable variation in the number of grades.

The School of Engineering has developed a portfolio of modular programmes in the context of a national situation of diminishing resources and reduced numbers of applications to engineering subjects. In light of this a level of shared learning activity between degree and EDEXCEL programmes has been introduced. There are many issues in the design, management and delivery of a portfolio of programmes in which there is shared learning activity but the key issue of grading systems is discussed in this paper. Discussion centres on a grading system which has substantial commonality between degree and BTEC programmes which has been developed within the School and has now been adopted university wide. Consideration is given to the implications of introducing the grading system at university level and the impact on the computerised student record system. A key issue involved the design of a system which retains the present identity of degree classification and module grades pass, merit and distinction in EDEXCEL programmes whilst offering student groups a common framework of assessment feedback.

With increasing student staff ratios efficient delivery, assessment and management of programmes, whilst maintaining standards is of paramount importance and key issues such as assessment board reports and protocol and the appointment of external examiners is

addressed.

The implications of a grading scheme are also considered in light of the recent introduction of a learning outcomes model within the university and the issue of any compensation between elements of assessment. With the increase in the number of credit accumulation and transfer schemes (CATS) and number of integrated credit systems existing in Europe concern is expressed that developments in grading systems and their relationships with credit systems have been overlooked. Despite several credit systems existing the notion of unified systems for both the award of credit points and grades is not ruled out.

## 1. Introduction to Grading Systems and Awards.

There are numerous assessment grading systems both numerical and alphabetical employed in higher education in the United Kingdom and Europe. Commonly used numerical scales include the scale ranging from zero to one hundred normally expressed as a percentage and the scale ranging from zero to ten. Alphabetical scales have increased in popularity over recent years and again a variety are used for example grades A,B,C,D and E in GCSE 'O' and 'A' levels, Pass (P) Merit (M) and Distinction (D) in EDEXCEL (BTEC) programmes and others which provide more increments by sub-dividing grades e.g A+, A and A- or A1, A2 and A3. All grading scales can be used to grade items of assessed work, often referred to as units of assessment, and in modular study programmes to grade each module studied. In the latter case grades are normally reported to the student in the form of a transcript at the end of assessment periods. In EDEXCEL programmes accumulation of a number of modules, often referred to as credit, entitles the student to a certificate e.g. Higher National Diploma in Engineering. In degree level programmes it is normal practice to provide a transcript at the end of each stage of the programme but

unlike EDEXCEL programmes the certificate awarded on successful completion of the programme normally classifies overall performance ranging from first class honours to pass degree.

Whilst it is necessary to retain the identity of awards from each awarding body the systems used, even in the same institution, allow a considerable variation in the practice used in determining grades for units of assessed work, in modules and in the feedback given to students. In many institutions this variation in practice results from marking assessed work using one grading scale which at some point in the grading process requires conversion to a grade which is part of another grading scale. A typical example is the marking of individual items of assessed work in a percentage scale with conversion resulting in an alphabetical grade being recorded. This approach can lead to tutors developing their own conversion formula which can therefore lead to a significant variation in practice. Where educational establishments offer a variety of undergraduate level programmes for example degree and EDEXCEL diplomas this problem may be compounded as a result of differing overall grading requirements.

## 2. Grading Systems

### 2.1 Existing Systems

Traditional marking using a percentage scale in both coursework and examinations is common place but at some point in the grading process there will be many cases where the requirement will be to record an alphabetical grade at both unit level and module level. The task can be a complex one as in order to arrive at the module grade assessment weightings need to be taken into account. Engineers find the percentage scale relatively easy to use particularly when assessing numerical questions, however marking schemes are relatively more complex than in some subject areas. Complex marking schemes employing a percentage scale and the subsequent marking of work is normally very time consuming unless electronic marking is used, in typically, the multiple choice type assessment. With increasing student staff ratios efficiency gains are needed whilst maintaining the quality of the student learning experience. In terms of assessment the question is raised as to whether a percentage scale with sixty increments in the pass range, with the pass mark at typically 40%, is really necessary on the basis that

the ultimate module pass grade is one of three in EDEXCEL programmes and one of twelve in an alphabetical system using three grades in each category A,B,C and D. In many subject areas assessment takes the form of report or essay writing and marking schemes employed for this type of work tend to be simpler and although there may be weighted components the exactness resulting from a percentage scale is considered unnecessary. It is questionable whether one can consistently distinguish between assignments marked as 25% and 26% or between assignments marked as 82% and 83% for example. A descriptor which provides guidance as to the level of attainment to which an alphabetical grade can be allocated is an alternative to a percentage scale. There is an advantage in marking assignments and other assessed work using descriptors in terms of simpler marking schemes and reduced marking time. The number of descriptors will dictate the number of alphabetical grades or vice versa.

For example - EDEXCEL programmes utilise descriptors grades which are:

**Pass** - *satisfactory performance in all major areas of a module.*

**Merit** - *significantly better than a pass in all areas of a module or outstanding in some areas with pass performance in the others.*

**Distinction** - *outstanding performance in all major areas of a module.*

Descriptor based marking can be used in the subject area of engineering with the same ease that is found in other subjects however there is some reluctance to employ this type of marking.

Descriptor based marking is particularly useful in the marking of projects, laboratory work and written assignments and can be used with examination questions although there is still a tendency to mark using percentages and convert to the required grading scale.

Descriptors provide useful feedback to students in that some indication as to the level of performance and any defects in the work is indicated, however in order to operate this type of grading an alphabetical report grade is normally given to the student and a corresponding numerical grade reported to the student record system. Record systems

can only make calculations based upon numerical data unless look up tables are used for the conversion of alphabetical grades.

With only three module grades this may prove unsatisfactory in grading units of assessed work, which could be increased to nine if three levels e.g. P-, P and P+ were introduced. A system of alphabetical grades A,B,C and D with three levels for each grade would provide twelve levels which is adequate in terms of formulating descriptors for each grade. The University of Derby introduced this type of grading system in 1992 for its credit accumulation modular scheme (CAMS) programmes at undergraduate level.

## 2.2 UG CAMS System Employed at the University of Derby.

The University grading system is used for its undergraduate degree level programmes but not EDEXCEL programmes. The grading system is shown in Fig 1 and comprises of twelve alphabetical pass grades ranging from the lowest grade of D- to the highest grade of A+. Attached to each grade is a performance level indicator in the form of a descriptor for example:

B+ *Very good standard, some minor defects*

The grading system is used for the marking of individual pieces of assessed work (unit of assessment) and in determining the module grade and overall stage grade for stages 1 and 2 and final classification of the degree. The grading system is operated if one starts by assessing the quality of the assignment, or other assessed work, and comparing the outcome with the array of descriptors on the chart. The assessor reports the alphabetical grade to the student for each unit and enters the corresponding numerical grade, as shown in the bold type, to the student record system. In an examination where an alphabetical grade is given for each question the overall numerical grade can be calculated as the average mark taking the weighting of each question into account. The other column of numbers indicate the boundary limits of each alphabetical grade. The use of percentage scales often undervalues a high level of attainment and overvalues a poor performance, and therefore the numerical scale must be designed to avoid such occurrences. Fig.2 shows the scale chosen which has the range 0 to 25. The vertical lines indicate the sixteen descriptors and the corresponding

percentage mark is shown. In operation conversion of alphabetical grades to the numerical grades shown has proven to give a normal distribution of marks.

The student record system data base calculates the overall coursework mark from the unit values and their respective weightings and records a numerical mark to two significant figures. The examination mark, where applicable, is also recorded to two significant figures. The module grade is calculated according to the coursework/examination weighting applying to it and recorded to the same accuracy. The three numerical grades and the corresponding module alphabetical grade appear on the assessment board reports the latter grade being reported to the student. The two grades in the left hand column, namely pass and distinction are used in determining the overall stage grade in stages 1 and 2 of a programme in which a certificate or diploma at pass or distinction level is awarded.

The benefits of introducing this type of system can be summarised as:

Standardisation of marking schemes

Reduced complexity of marking schemes

Consistent feedback to students in terms of a range of grades and descriptors.

Standardisation of assessment board reports

- Simplified programming of student record system
- Reduction in marking time
- Entry marks on individual items of assessed work (unit level)

However, since this grading system did not encompass EDEXCEL programmes there remained a wide variation in practice in these programmes, for example, some schools marked units of assessed work in percentages and others used pass, merit and distinction and each school would have its own formula for converting these marks, taking unit weightings into account in order to determine the overall grade using the same range. Clearly this inconsistent approach led to variation in the degree of feedback to students and at the same time made it virtually impossible to programme the student record system as this would have required specifically designed programmes for

each school. The reason for this non standard approach to EDEXCEL grading is mainly historical as each school developed and validated programmes in isolation and no opportunity existed, prior to the granting to the University of the EDEXCEL licence, to discuss University wide solutions to such issues.

### **3. Curriculum Developments in Engineering Programmes**

There are increasingly more opportunities for study at degree level in the UK and abroad and many students at present in education studying typically EDEXCEL and C & G programmes or who have studied in the past and now need to update their skills, will look to advancing their academic qualifications typically to undergraduate degree level. Many modular study programmes are operated within a credit framework in which credit can be accumulated and transferred if necessary within CAMS and CATS.

In the Autumn of 1996 the School of Engineering at the University of Derby launched a portfolio of programmes operating within the confines of a credit accumulation modular scheme. The portfolio is offered at various levels which include EDEXCEL Higher National Certificates and Diplomas and University validated BSc and BSc(Hons) programmes. This has been undertaken in the context of a national situation of diminishing resources and reduced numbers of applications to engineering subjects. In light of this a level of shared learning activity between degree and EDEXCEL programmes has been introduced. There are many issues in the design, management and delivery of a portfolio of programmes in which there is shared learning activity but an important requirement is the development of a grading system which has substantial commonality between degree and EDEXCEL programmes.

The relationship between degree and EDEXCEL programmes is such that at stage 1 all programmes within a given subject area are designed to allow students to develop a grounding in fundamental covering electrical and electronic principles, digital electronics, measurements, testing, information technology and electronic computer aided design. Hence it possible for modules covering such fundamentals to have identical syllabi for both degree and EDEXCEL programmes. This philosophy can be extended to stage 2 (final stage in EDEXCEL programmes) in some modules. Modules

common to both types of programme will have common assessment methods and therefore it is important that student feedback is also consistent. The only difference required in the assessment process is in respect of the module grade in which the relevant identity needs to be maintained.

### **4. Standard Grading System for Degree and EDEXCEL Programme.**

The undergraduate CAMS grading system is based on performance descriptors and this has a direct parallel with guidance issued by EDEXCEL in relation to criteria referencing and therefore how institutions should go about the allocation of grades.

The University was granted the EDEXCEL licence in 1993 thus providing the opportunity to standardise grading initially across EDEXCEL programmes and ultimately across all undergraduate programmes. Programmes in the School of Engineering were being developed to include substantial shared learning activity between degree and EDEXCEL programmes. Additional benefits to the degree level grading system can be summarised as:-

- Comparable treatment to both degree and EDEXCEL students on modules with respect to the level of assessment feedback received, this being particularly important where modules have shared learning activity.
- a single grading system applicable to both degree and EDEXCEL students removes any confusion which there may have been in the past over which grade to allocate to which type of student.
- Entry of assessment data at unit level in both degree and EDEXCEL programmes.
- Ability of central administration via the student record system to provide assessment board reports which automatically calculate the student's module pass grade.
- Layout of assessment board reports by module listing alphabetical and corresponding numerical grade conforming to the single grading system with the addition of EDEXCEL formal grades for the appropriate students.

Given that the existing grading system is part of the Universities academic regulations it was envisaged that it would be difficult, if not impossible, to make changes to that grading system in the short term and therefore the challenge was to develop a grading system for EDEXCEL programmes which would have substantial commonality with the existing system. Key issues include the design of a system which retains the present identity of module grades pass, merit and distinction in EDEXCEL programmes and where there is shared learning activity between degree level and EDEXCEL programmes the ability to provide consistent feedback to students in the form of a grade and descriptor for units of assessed work. A grading system meeting these requirements was developed in the School of Engineering and placed on trial over an academic year proving very successful. The next stage involved submitting the grading system for approval at university level, therefore widening the debate which resulted in some modifications.

The system adopted is shown in Fig 3. Careful comparison of Fig 1 and Fig 3 will show that both tables share the same report grades (alphabetical grades) and the same numerical grades. The pass grades range from D- to D+, the merit from C- to B and distinction from B+ to A+ in EDEXCEL programmes. There is a slight variation in the descriptors used in merit grades C-, C and B- which equate better to the overall descriptor for merit as stated by EDEXCEL but is not designed to cause any variation in grading where an item of assessed work in a module in which there is shared activity is of the same standard. The original grading table developed and operated by the School of Engineering in fact had identical descriptors but set the minimum merit level at grade C thus making four grades in each category. The University forum responsible for EDEXCEL programmes however considered that the normalised distribution of marks in a grading system should be reflected by five grades in the middle range category.

## **5. Assessment Board Reports, Protocol and Appointment of External Examiners.**

Assessment board reports are normally available in two forms which are module reports, which detail performance in overall coursework and in examination where applicable, and an overall module grade for all students taking the module. It is normal to hold a module assessment board and with

a single grading system it is possible to consider degree and BTEC students at the same time and not necessary to hold separate boards is the case where grading systems differ. Reports can list students in alphabetical order and EDEXCEL students can be easily noted because they will have a different programme code but in addition to the standard alphabetical grade they will receive one of the grades pass, merit or distinction. Reports listing the two groups separately is possible but not necessary.

The second type of report which can be generated is the overall student profile and normally these are considered at a second board normally referred to as the programme board in which student progression and awards are decided. Again reports use a common format which show for both groups the standard alphabetical range, the EDEXCEL student reports displaying the additional pass, merit or distinction grade. Separate boards are normal for each group as regulations concerning awards and progression may differ, however where a module is common to both groups comparison in performance can easily be made with the standard system. A typical listing in module board report is shown in Fig 4.

External examiners are interested in the academic standards of the programme and therefore need to monitor the differences in rigour between degree and EDEXCEL students, as well as overall standards. In order to achieve this, external examiners need to be appointed on the basis of subject specialisation and are responsible for both degree and EDEXCEL programmes. Modules common to all programmes are assigned to the most appropriate examiner thus avoiding operational difficulties that would arise if each external examiner was responsible for common programme modules.

## **6. Conclusions.**

The new standardisation grading system has been operational since September 1996 and therefore the results for one academic year can be scrutinised. Studies will be made to check whether there is any undue change in the number of grades awarded in each of the three EDEXCEL module grades, which in turn may require some adjustment to the threshold levels set.

Competence based grading systems are relatively new and have been adopted in

NVQ's and GNVQ's which are mainly available in programmes at levels below the higher national. Competence based assessment is similar to the assessment of learning outcomes in which both set a threshold level which determines whether a skill or outcome has been achieved.

Many universities have now introduced learning outcomes based assessment models and therefore grading systems employed may need some revision. The relationship between the requirement to achieve learning outcomes and the grade awarded for a unit of assessed work can be a complex one. For example, it is possible in a marking scheme to award a pass grade yet fail a learning outcome(s). This would normally occur in relatively large units of work perhaps testing three or four learning outcomes, and where the overall performance warrants a pass grade.

If the assessment model requires all learning outcomes to be achieved then careful design is required in module assessment in considering the number of units of assessment, the number of learning outcomes and their distribution within the units.

University of Derby regulations allow compensation in modules, where assessment comprises of coursework and examination, down to grade Fm - on the grading chart in either assessment mode providing the overall module grade is calculated at D- or better. It is recognised that some students do not perform as well under examination conditions as they do in coursework assessment. This is particularly true of engineering students and therefore compensation can make the difference between success and possible referral or failure. However, learning outcome models may nullify the validity of any compensation and as previously indicated careful consideration as to the design and purpose of learning outcomes is essential to avoid this.

EDEXCEL have introduced in their new engineering guidelines a learning outcome assessment model to be implemented in 1999 for existing programmes and specify that a module pass grade is awarded for the achievement of all outcomes against the specified assessment criteria. Merit and distinction grades are awarded for higher levels of achievement. Grade descriptors have also been revised and now four are specified in each of the three grades indicating the relative level of achievement. The descriptors are designed for grading the total evidence produced in a module (now renamed unit by EDEXCEL). Some modules

may not give the opportunity for the use of all the descriptors and therefore a selection most appropriate to the module is used. An example of each of the three levels is:

**Pass** - *knowledge & comprehension of relevant practice, appropriate theories or techniques.*

**Merit** - *the application of appropriate knowledge and understanding of relevant practices, theories & techniques.*

**Distinction** *the application of knowledge and understanding of a range of relevant practises, theories or techniques.*

The Engineering Council's SARTOR 97 (Standards and Routes to Registration) policy document will also take effect in 1999.

The standards to achieve Incorporated Engineer (I.Eng) and Chartered Engineer (C.Eng) status have been raised, and therefore it is anticipated that more students will opt to take degree level programmes as these will set the lower limit for I.Eng status. Many employees and students who have recently completed a programme of study are upgrading their existing qualifications and the number is expected to increase as industry, in order to compete in world markets, will require a more highly skilled workforce. Progression from EDEXCEL programmes to degree level programmes is expected to increase and therefore credit accumulation, credit transfer and module grading will become important factors to the admissions tutor in assessing suitability. A number of integrated credit systems exist in Europe each one having a different number of credits per module and in some cases a variation in the number of standard modules making up the programme.

This occurs as a result of the relationship between the notional learning time and the credit awarded for this time. For example institutions using inherited CNAA systems use a stage credit of 120 points which can be compared with the University of Derby system, where the stage credit is 32 points based upon a notional learning time of thirty hours gaining one credit point. The European Community Credit Transfer Scheme (ECTS) is based on the premise that there is such diversity in the practice of the awarding of academic credit in Europe, that it is necessary to adopt a pragmatic approach.

A ECTS stage credit of 60 points is based on the premise that the level of work undertaken by students at appropriate stages of their programme in different E U Universities is comparable in demand. Furthermore the system assumes that the learning effort undertaken by students in a full-time year is also comparable. The considerable variation in credit and grading systems makes translation between systems

difficult and inhibits transfer from one programme of study to another.

The possibility of a universal system, in modular undergraduate programmes, encompassing both the award of credit and the level of attainment, on a module basis, is not unreasonable however, it is difficult to imagine how the diversity of current practice can be moulded to produce this result.

Figure 1

### CAMS Assessment Grades

#### Descriptors for Levels 0, 1 and 2

A guide for the marking of individual pieces of work

		Report Grade	Numerical Grade	
DISTINCTION	Outstanding, exceptionally high standard, trivial defects only	A+	24	DISTINCTION
	Excellent in most respects, very minor defects	A	22	
	Very good to excellent, a few minor defects	A-	18	
	Very good standard, some minor defects	B+	17	
PASS	Generally very good, but with some defects	B	16	PASS
	Good to very good, but with some notable defects	B-	15	
	Good creditable work, but with a few notable defects	C+	14	
	Good, generally sound, but a number of notable defects	C	13	
	Quite good, but with a number of shortcomings	C-	12.5	
	Fair standard, but with a number of shortcomings	D+	12	
	Satisfactory, but with a number of significant shortcomings	D	11	
	On the borderline between satisfactory and unsatisfactory, a number of significant shortcomings	D-	10	
FAIL	Unsatisfactory, some significant/serious shortcomings	Fm	9	FAIL
	Unsatisfactory, a number of serious shortcomings	Fm-	7	
	Very poor standard/some relevant information	F	5	
	Exceedingly poor/very little of merit	F-	2	
	Nil response/work not attempted/nothing of merit	NR	0	

**Report grade** Alphabetical grade determined by the assessor and reported to student.

**Numerical grade** Numerical weighting corresponding to the report grade, which is used to calculate the overall module grade and the overall stage performance.

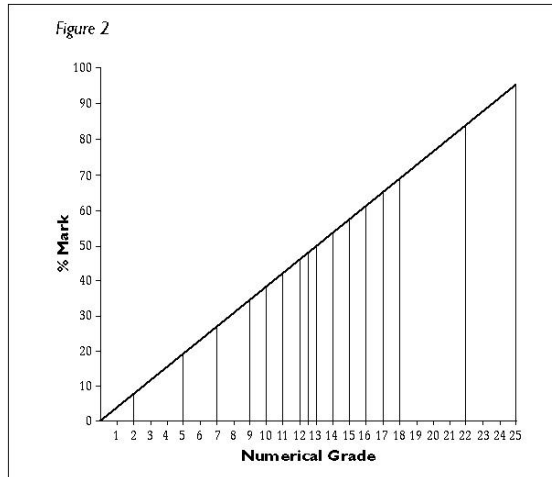


Fig 4

**MODULE ASSESSMENT BOARD REPORT**

NAME	PROGRAMME	COURSEWORK Wght 0.5	EXAMINATION Wght 0.5	MODULE/ GRADE



GREGSON P	4CHEEE	13.70	20.00	16.85 B+ (Distinction)
GOSSLING A	H682	18.10	20.50	19.30 A-
OAKDEN B	286H	13.15	11.75	12.45 C- (Merit)
LUNDIE R	HH56	7.00	5.00	6.00 Fm-

This module is common to a number of programmes as can be seen from different programme codes which are:-

4CHEEE	-	HNC Electrical & Electronic Engineering
HH56	-	BSc (Hons) Electrical & Electronic Engineering
286H	-	HND Electronics with Music Technology
H682	-	BSc (Hons) Music Technology with Audio System Design

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