Module Marks 2022-23

Contents

1. Average and standard deviation on marks after moderation

2. Moderation rules and moderation data

1. Average and standard deviation after moderation

The table below gives the average and standard deviation for all modules in the department of Electrical and Electronic Engineering for the academic year 2022-2023, after moderation.

stream	Paper number	No. of students registered	Average	Standard deviation
E1	ELEC40002	194	58.38	16.17
E1	ELEC40003	194	58.21	14.60
E1	ELEC40004	194	64.16	12.62
E1	ELEC40006	194	69.60	7.39
E1	ELEC40009	194	63.61	14.52
E1	ELEC40010	194	63.01	17.70
E1	ELEC40011	194	51.47	15.68
E1	Year 1 Maths	194	56.04	15.17
E2	ELEC50001	72	59.26	13.73
E2	ELEC50002	72	65.04	10.90
E2	ELEC50004	72	61.66	15.30
E2	ELEC50007	72	57.98	16.12
E2	ELEC50008	72	67.46	4.64
E2	Year 2 Maths	72	57.30	18.54
E2	ELEC50012	72	54.05	14.32
E2	ELEC50013	72	57.15	11.97
I2	ELEC50002	146	63.91	10.25

I2	ELEC50003	146	67.24	6.52
I2	ELEC50004	146	64.48	11.81
I2	ELEC50006	146	63.31	15.47
I2	ELEC50009	146	65.88	6.08
I2	ELEC50010	146	63.01	11.83
I2	Year 2 Maths	146	62.19	16.78
I2	ELEC50014	146	65.25	10.98
	ELEC60002	36	71.68	18.31
	ELEC60003	56	62.94	19.33
	ELEC60004	14	49.96	11.82
	ELEC60005	38	58.90	18.28
	ELEC60006	57	55.26	13.51
	ELEC60008	49	66.70	15.33
	ELEC60009	58	72.81	12.19
	ELEC60010	42	64.63	15.00
	ELEC60011	45	74.36	7.11
	ELEC60012	22	58.45	16.59
	ELEC60013	126	67.93	7.68
	ELEC60015	33	69.60	9.50
	ELEC60018	32	75.38	12.36
	ELEC60019	72	63.73	13.53
	ELEC60020	12	69.52	3.96
	ELEC60021	122	53.92	19.25
	ELEC60022	11	71.85	15.01
	ELEC60023	13	73.65	16.27

	ELEC60024	21	74.24	8.67
	ELEC60025	10	67.47	15.32
	ELEC60029	28	65.14	19.87
	ELEC60030	46	73.70	13.23
	ELEC60031	7	61.17	19.04
	ELEC60033	31	63.88	6.37
	ELEC70001	39	77.00	13.40
	ELEC70003	4	72.43	0.86
	ELEC70004	19	65.67	15.41
	ELEC70006	2	80.63	2.65
	ELEC70009	2	68.47	20.20
	ELEC70012	20	71.10	5.03
	ELEC70013	5	55.00	21.38
	ELEC70015	28	74.89	7.50
	ELEC70022	10	69.31	7.80
	ELEC70028	2	66.28	7.96
	ELEC70030	102	85.05	23.01
	ELEC70037	76	79.46	6.76
	ELEC70039	2	91.00	12.02
	ELEC70045	4	78.56	20.55
	ELEC70047	7	68.91	4.52
	ELEC70048	13	62.58	15.27
	ELEC70051	4	69.18	16.00
	ELEC70056	71	78.59	11.09
	ELEC70065	1	57.32	

	ELEC70066	8	78.11	11.02
	ELEC70067	1	68.00	
	ELEC70069	37	78.62	5.95
	ELEC70070	9	69.20	12.17
	ELEC70071	21	73.05	11.80
	ELEC70073	91	72.13	6.90
	ELEC70074	3	77.00	10.48
	ELEC70075	44	65.46	10.28
	ELEC70076	45	68.77	10.19
	ELEC70078	39	73.16	14.42
	ELEC70079	1	60.00	
	ELEC70080	2	61.25	15.91
	ELEC70081	2	67.50	0.71
	ELEC70090	5	71.35	9.95
	ELEC70091	5	49.05	4.27
	ELEC70092	2	65.00	5.30
	ELEC70098	161	71.55	14.71
	ELEC70101	10	69.30	9.65
	ELEC70102	3	58.08	7.48
	ELEC70103	46	79.04	12.48
	ELEC70104	7	78.00	-
	ELEC70105	51	88.00	21.57

1. Moderation of Module Marks

Department of Electrical & Electronic Engineering

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Moderation of marks is applied in four circumstances. Moderation is used to ensure that assessments are consistent where different candidates were marked by different assessors (such as in project and laboratory work).

Moderation is also used to ensure that assessments that are somewhat more difficult than expected do not lead more candidates failing than expected. It is also used to ensure that assessments that are somewhat more easy than expected do not lead more candidates achieving first class honours overall than expected. We do this to ensure that the first class honours classification retains its prestige. These points are routinely checked for all modules including those assessed by exam and those assessed by coursework (and combinations of the two). It is expected that moderation will only be required for a small number of modules and that assessors will be asked to ensure that future assessments are set to avoid moderation being needed.

The final reason for applying moderation is to ensure that variation in assessment standard between optional modules does not disadvantage or over-reward candidates marking certain module choices. This is routinely checked for all 3rd and 4th year modules taken by a large enough number of candidates to allow meaningful statistical analysis. Again, the aim is to set assessments which do not call for moderation.

Moderation of Assessment Marks between Different Assessors

Final Year Individual Projects

First and foremost, the guidance and the marking forms used by markers define how features of a candidate's performance map to marks so that assessors concentrate on identifying performance against benchmarks before moving to awarding marks. This is designed to achieve consistency and equity in the marking process. Further, each project has a first marker and second marker who assign marks and then must reach an agreed mark by discussing any differences. Finally, projects in the same topic areas are arranged in rank order and then topic experts can moderate marks if an anomaly is identified.

Laboratory Reports, Logbooks and Group Projects

First and foremost, clear definitions of levels of performance for each grade are identified. Laboratory supervisors then perform statistical analysis on marks from each assessor and can make adjustments if in their judgment they are needed to correct differences in assessment standards. Group project organisers look at projects in rank order and use their judgement to adjust marks if the markers comments indicate a different ordering to the marks or if other anomalies are identified in the overall marks.

Moderation of Module Marks for Overall Assessment Standard

Moderation is applied to 1st and 2nd year modules if that module produces either an abnormally large number of E and F-grade results (failures) or an abnormally large number of A-grade results.

It is a piece-wise linear scaling function that preserves the rank order of the candidates. Four parameters are defined:

N_A^{Max} is the expected maximum number of candidates obtaining grade A and is set at 30% of the candidates

$mark_{A/B}$ is the boundary between A and B grades and is set at 70.

$N_{E/F}^{Max}$ is the expected maximum number of candidates obtaining grade E or F and is set at 10% of the candidates

$mark_{D/E}$ is the boundary between D and E grades and is set at 40.

The rank order list of candidate's marks for each module is examined and two tests are applied.

If the number of candidates scoring above $mark_{A/B}$ is greater than $N_A{}^{Max}$ then moderation of the marks at the top of the class is required. To do this we identify $mark_{30C}$, the mark of candidate at position $N_A{}^{Max}$ which is boundary of top 30% of candidates (known as the 30th centile).

If the number of candidates scoring below $mark_{D/E}$ is greater than $N_{D/E}{}^{Max}$ then moderation of the marks at the bottom of the class is required. To do this we identify $mark_{90C}$, the mark of candidate at position $N_{E/F}{}^{Max}$ is the boundary of bottom 10% of candidates (known as the 90th centile).

If moderation at both ends of the class is required the algorithm applied is:

If $mark < mark_{90C}$

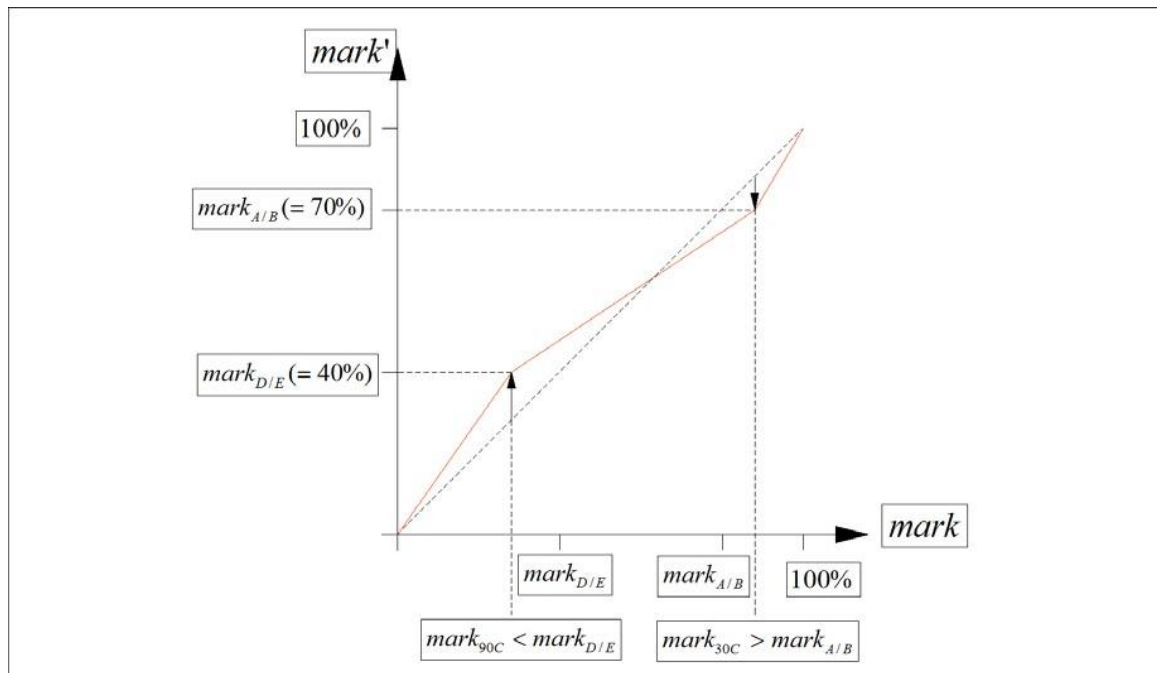$$\text{then } mark' = mark\, \frac{mark_{D/E}}{mark_{90C}}$$

elseif $mark < mark_{30C}$

$$\text{then } mark' = mark_{D/E} + (mark - mark_{90C})\, \frac{(mark_{A/B} - mark_{D/E})}{(mark_{30C} - mark_{90C})}$$

else

$$mark' = mark_{A/B} + (mark - mark_{30C})\, \frac{(100 - mark_{A/B})}{(100 - mark_{30C})}$$

This process can be represented as a graph as follows:

If moderation is to be applied at the top only then the algorithm is

If $mark < mark_{D/E}$

   then $mark' = mark$

elseif $mark < mark_{30C}$

   then $mark' = mark_{D/E} + (mark - mark_{90C})\dfrac{(mark_{A/B} - mark_{D/E})}{(mark_{30C} - mark_{D/E})}$

else

$$mark' = mark_{A/B} + (mark - mark_{30C})\dfrac{(100 - mark_{A/B})}{(100 - mark_{30C})}$$

If moderation is to be applied at the bottom only then the algorithm is

If $mark < mark_{90C}$

   then $mark' = mark\dfrac{mark_{D/E}}{mark_{90C}}$

elseif $mark < mark_{30C}$

   then $mark' = mark_{D/E} + (mark - mark_{90C})\dfrac{(mark_{A/B} - mark_{D/E})}{(mark_{A/B} - mark_{90C})}$

else

   $mark' = mark$

Moderation of Module Marks between Optional Modules

We seek to adjust module marks if the module marks are judged to be abnormally high or low in the light of how those candidates taking the module performed in their other modules. All the department's own 3rd and 4th year modules (i.e., not business, humanities or computing modules) that are taken by at least 6 EEE or EIE students (i.e., not including students from other departments or occasional students) are considered for potential moderation through the following steps.

1. The module average for all EEE/EIE candidates sitting the exam is calculated and termed the inclusive average (A_{Inc}) for that module.

2. The average mark for all the other modules taken the EEE/EIE candidates s taken the module is question is calculated and termed the exclusive average (A_{Exc}). This is sum of all the marks for all the other EE exams sat by the EEE/EIE candidates divided by number of all the other EE exams sat by the EEE/EIE candidates.

3. If difference between the exclusive and inclusive averages is more than 6% then the module mark for every candidate (not only EEE/EIE candidates) is adjusted by half the difference (with limits applied at 0% and 100%). The moderated mark for every candidate becomes:

$$\text{If } abs(A_{Exc} - A_{Inc}) > 6$$
$$\text{then } mark' = mark + \tfrac{1}{2}(A_{Exc} - A_{Inc})$$
$$\text{else}$$
$$mark' = mark$$

4. To prevent the moderation process from failing 3rd year, 4th year and MSC students, the following exceptions are applied:

   a. For 3rd year students: If a raw module mark is 40% and above, it cannot be adjusted down to below 40%. If a raw module mark is below 40%, then it cannot be adjusted down, but can be adjusted up.

   b. For 4th year and MSc students: If a raw module mark is 50% and above, it cannot be adjusted down to below 50%. If a raw module mark is below 50%, then it cannot be adjusted down, but can be adjusted up.

1st and 2nd Year EE and EIE Scaled Modules

Course Code	Course Title	Pass Mark	Top Mark
ELEC40004	Programming for Engineers	40	79
ELEC40006	Electronics design project 1	40	75
ELEC40009	Topics in Electrical Engineering	40	74
maths	Mathematics 1 (E-stream and I-stream)	35.5	70
ELEC50002	Communications	40	80
ELEC50003	Computer Engineering Design Project	40	77
ELEC50004	Control systems	40	81
ELEC50006	Discrete mathematics	40	77
ELEC50007	Electromagnetism	40	71
ELEC50008	Electronics design project 2	40	77
ELEC50012	Power Electronics and Power Systems	39.5	70
ELEC50014	Software Systems	40	80
maths	Mathematics for Engineers II (E-stream and I-stream)	40	78

Adjustments to Part III and Part IV Marks

Course	Title	Original Average for Course including Coursework when relevant %	Original Exclusive Average for same population %	Adjustment %
ELEC60004	Artificial Intelligence	49.38	58.28	4.45
ELEC60005	Biomedical Electronics	54.41	62.53	4.06
ELEC60008	Control Engineering	72.48	63.20	-4.64
ELEC60010	Digital Signal Processing	70.17	58.83	-5.67
ELEC60020	Managing Engineering Projects	72.50	64.82	-3.84
ELEC70004	Analogue Signal Processing	62.01	70.85	4.42
ELEC70048	Probability and Stochastic Processes	57.73	67.44	4.86
ELEC70069	Coding Theory	83.35	73.90	-4.72
ELEC70075	Power System Economics	58.58	72.34	6.88