Module Marks 2021-2022
Contents

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 2020-2021, after moderation

stream	papernumber	takers	average	standard deviation
E1	ELEC40002	226	56.95	14.67
E1	ELEC40003	226	63.42	12.57
E1	ELEC40004	226	64.20	15.03
E1	ELEC40006	226	68.55	6.62
E1	ELEC40009	226	64.78	12.34
E1	E1 Maths	226	58.51	14.26
E2	ELEC50001	83	59.52	14.28
E2	ELEC50002	83	65.01	13.68
E2	ELEC50004	83	60.54	15.90
E2	ELEC50007	83	57.03	14.32
E2	ELEC50008	83	65.40	10.85
E2	ELEC50011	83	59.83	15.27
E2	ELEC50012	83	60.01	16.14
E2	ELEC50013	83	56.90	14.87
I2	ELEC50002	119	65.70	10.64
I2	ELEC50003	119	64.69	10.22
I2	ELEC50004	119	61.45	13.08
I2	ELEC50006	119	65.64	10.68
I2	ELEC50009	119	64.89	10.45
I2	ELEC50010	119	63.60	11.84
I2	ELEC50011	119	62.54	13.40
I2	ELEC50014	119	66.56	11.11

papernumber	takers	average	standard deviation
EE4-01	13	73.22	12.47
EE4-05	1	31.25	
EE4-06	3	65.25	26.18
EE4-07	47	69.83	3.06
EE4-08	40	70.43	15.61
EE4-10	12	59.86	26.63
EE4-12	4	57.00	16.06
EE4-13	46	75.99	11.93
EE4-14	8	68.57	22.20
EE4-16	13	68.13	15.84
EE4-17	12	58.80	14.10

EE4-18	6	63.03	6.43
EE4-20	28	69.61	6.33
EE4-23	6	63.39	16.04
EE4-24	1	46.01	
EE4-25	6	63.96	19.82
EE4-27	5	61.00	34.25
EE4-29	187	69.29	12.79
EE4-40	15	66.97	16.77
EE4-45	16	74.64	17.81
EE4-47	15	63.60	11.98
EE4-48	6	79.14	11.60
EE4-50	45	67.39	16.35
EE4-51	28	66.94	15.80
EE4-53	7	64.89	18.11
EE4-54	9	65.72	18.81
EE4-55	8	61.43	20.34
EE4-60	57	75.46	7.78
EE4-66	34	70.03	3.10
EE4-69	46	74.09	15.02
EE4-70	41	75.99	8.41
EE4-71	31	75.23	15.00
EE4-93	125	77.26	7.50
EE4-94	7	68.87	21.46
EE4-95	1	89.91	
ELEC60002	44	76.17	15.20
ELEC60003	33	73.03	10.18
ELEC60004	135	58.11	12.84
ELEC60005	48	65.43	11.53
ELEC60006	23	62.12	11.35
ELEC60007	6	77.14	2.98
ELEC60008	33	68.94	15.48
ELEC60009	75	69.97	8.57
ELEC60010	28	71.96	13.76
ELEC60011	60	74.25	7.10
ELEC60012	15	66.13	17.21
ELEC60013	130	71.51	8.95
ELEC60015	50	72.03	7.94
ELEC60018	13	64.42	10.18
ELEC60019	82	70.07	9.51
ELEC60020	19	69.88	19.62
ELEC60021	103	67.04	14.03
ELEC60022	5	70.16	14.11
ELEC60023	9	75.97	12.32
ELEC60024	21	71.96	14.69
ELEC60025	5	70.11	4.39
ELEC60029	17	76.79	11.82
ELEC60030	43	78.07	5.28
ELEC60031	13	63.07	27.15

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:

$$\text{If } mark < mark_{90C}$$

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

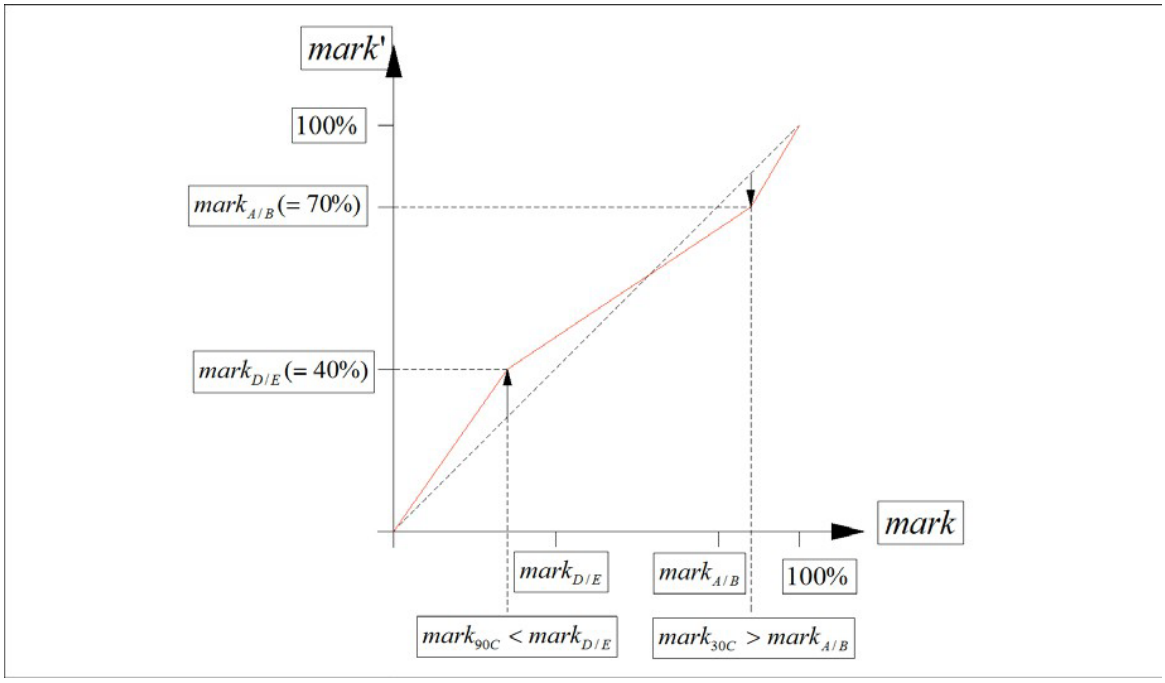
$$\text{elseif } mark < mark_{30C}$$

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

$$\text{else}$$

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

This process can be represented as a graph as follows:



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

$$\text{If } mark < mark_{D/E}$$
$$\text{then } mark' = mark$$
$$\text{elseif } mark < mark_{30C}$$
$$\text{then } mark' = mark_{D/E} + (mark - mark_{90C}) \frac{(mark_{A/B} - mark_{D/E})}{(mark_{30C} - mark_{D/E})}$$
$$\text{else}$$
$$mark' = mark^{A/B} + (mark - mark^{30C}) \frac{(100 - mark_{A/B})}{(100 - mark_{30C})}$$

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

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

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:

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

1st and 2nd Year EE and EIE Scaled Modules

Course Code	Course Title	Pass Mark	Top Mark
ELEC40002	Analysis and Design of Circuits	35	70
ELEC40003	Digital Electronics & Computer Architecture	40	74
ELEC40004	Programming for Engineers	40	79
ELEC40009	Topics in Electrical Engineering	40	79
maths	Mathematics 1 (E-stream and I-stream)	35	70
ELEC50001	Circuits and systems	40	70
ELEC50002	Communications	40	79
ELEC50003	Computer Engineering Design Project	40	70
ELEC50004	Control systems	40	77
ELEC50006	Discrete mathematics	40	78
ELEC50007	Electromagnetism	31.5	70
ELEC50008	Electronics design project 2	40	70
ELEC50009	Information Processing	40	73
ELEC50010	Instruction Architectures and Compilers	40	71
ELEC50012	Power Electronics and Power Systems	38	75
ELEC50013	Signals and Systems	38.5	70
ELEC50014	Software Systems	40	82
maths	Mathematics for Engineers II (E-stream and I-stream)	34	70

Compensating 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 %
EE4-10	Probability and Stochastic Processes	49.46	62.88	6.71
EE4-13	Adaptive signal processing and machine intelligence	78.18	71.35	-3.42
EE4-29	Optimization	65.34	72.56	3.61
EE4-40	Information Theory	60.00	77.28	8.64
EE4-48	Power System Dynamics, Stability and Control	85.33	72.94	-6.20
EE4-53	HVDC Technology and Control	60.34	69.44	4.55
EE4-55	MEMS and Nanotechnology	57.50	65.36	3.93
EE4-69	Signal Processing and Machine Learning for Finance	78.76	70.54	-4.11
ELEC60002	Advanced Signal Processing	76.70	70.42	-3.14
ELEC60004	Artificial Intelligence	50.04	67.16	8.56
ELEC60007	Communication Systems	81.83	72.45	-4.69
ELEC60008	Control Engineering	75.51	65.02	-5.25
ELEC60013	Embedded Systems	68.26	75.41	3.57
ELEC60024	Power Electronics	74.74	68.37	-3.19
ELEC60029	Semiconductor Devices	79.56	72.00	-3.78
ELEC60030	Robotic Manipulation	83.15	72.98	-5.08
ELEC60031	Principles of Classical and Modern Radar Systems	57.23	64.30	3.53

Compensating Adjustments to Part III Marks

Course	Title	Original Average for Course including Coursework when relevant %	Original Exclusive Average for same population %	Adjustment %
EE3-GPRJ	3rd Year Group Project	73.86	66.34	-3.76
EE3-IP	3rd Year Industrial Placement	78.45	70.14	-4.15