Module Marks 2020-2021
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	average	standard deviation
E1	ELEC40002	61.26	14.75
E1	ELEC40003	61.47	13.19
E1	ELEC40004	63.60	14.95
E1	ELEC40006	67.78	11.23
E1	ELEC40009	62.21	13.55
E1	ELEC40010	58.19	13.77
E1	ELEC40011	57.86	13.98
E2	ELEC50001	64.95	10.53
E2	ELEC50002	69.14	6.89
E2	ELEC50004	63.76	11.97
E2	ELEC50007	66.11	12.72
E2	ELEC50008	66.29	9.39
E2	ELEC50011A	60.66	12.57
E2	ELEC50011B	60.66	12.57
E2	ELEC50012	63.83	12.88
E2	ELEC50013	63.83	12.27
I2	ELEC50002	69.76	7.44
I2	ELEC50003	66.80	9.32
I2	ELEC50004	65.66	10.39
I2	ELEC50006	65.92	11.94
I2	ELEC50009	67.27	6.37
I2	ELEC50010	65.37	9.17
I2	ELEC50011A	63.73	11.06
I2	ELEC50011B	63.73	11.06
I2	ELEC50014	68.83	8.95

Module Code	papernumber	takers	average	standard deviation
ELEC96003	EE3-01	34	77.24	11.44
ELEC96020	EE3-02	23	66.50	9.42
ELEC96008	EE3-03	21	75.29	13.78
ELEC96011	EE3-05	43	76.38	6.77
ELEC96010	EE3-07	61	69.36	13.06
ELEC96002	EE3-08	76	68.24	16.89
ELEC96009	EE3-09	80	68.77	17.06
ELEC96023	EE3-10	159	71.45	12.83
ELEC96001	EE3-11	23	73.86	7.46
ELEC96026	EE3-12	16	77.28	14.08
ELEC96017	EE3-13	31	61.59	17.34
ELEC96027	EE3-14	15	73.31	7.88
ELEC96005	EE3-16	76	66.74	14.97
ELEC96007	EE3-17	15	71.75	17.85
ELEC96024	EE3-18	7	66.43	15.74
ELEC96028	EE3-19	36	70.66	7.22
ELEC96006	EE3-21	40	67.16	9.33
ELEC96019	EE3-22	54	73.33	11.54
ELEC96031	EE3-23	96	69.43	12.90
ELEC96018	EE3-24	117	69.11	6.77
ELEC96033	EE3-25	118	73.03	9.78
ELEC96034	EE3-27	9	79.54	17.83
ELEC97004	EE4-01	5	68.41	22.92
ELEC97090	EE4-05	2	58.45	8.42
ELEC97060	EE4-06	4	60.40	27.77
ELEC97013	EE4-07	17	80.42	8.46
ELEC97021	EE4-08	32	72.91	13.85
ELEC97072	EE4-10	11	71.18	10.97
ELEC97023	EE4-12	6	51.90	14.96
ELEC97002	EE4-13	53	76.05	15.77
ELEC97079	EE4-14	7	52.70	29.90
ELEC97010	EE4-16	12	77.61	3.84
ELEC97041	EE4-17	8	70.27	8.40
ELEC97074	EE4-18	2	52.20	11.03
ELEC97037	EE4-20	18	66.53	8.53
ELEC97081	EE4-23	8	59.21	30.34
ELEC97027	EE4-24	4	59.83	6.70
ELEC97019	EE4-25	7	63.99	11.23
ELEC97085	EE4-27	6	68.34	8.35
ELEC97062	EE4-29	182	75.03	14.68

ELEC97048	EE4-40	18	61.54	19.62
ELEC97092	EE4-45	1	77.90	
ELEC97058	EE4-47	17	68.45	13.17
ELEC97066	EE4-48	2	64.00	5.66
ELEC97083	EE4-50	47	69.58	9.80
ELEC97068	EE4-51	11	74.62	9.41
ELEC97045	EE4-53	3	65.29	15.32
ELEC97070	EE4-54	11	60.11	23.78
ELEC97055	EE4-55	2	61.65	2.83
ELEC97025	EE4-57	2	74.20	8.20
ELEC97094	EE4-65	1	70.20	
ELEC97088	EE4-66	9	68.58	11.50
ELEC97064	EE4-68	9	70.67	19.21
ELEC97100	EE4-69	52	72.27	17.47
ELEC97105	EE4-70	32	76.34	7.89
ELEC97106	EE4-71	27	76.88	8.61
ELEC97112	EE4-93	107	74.93	7.26

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:

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

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

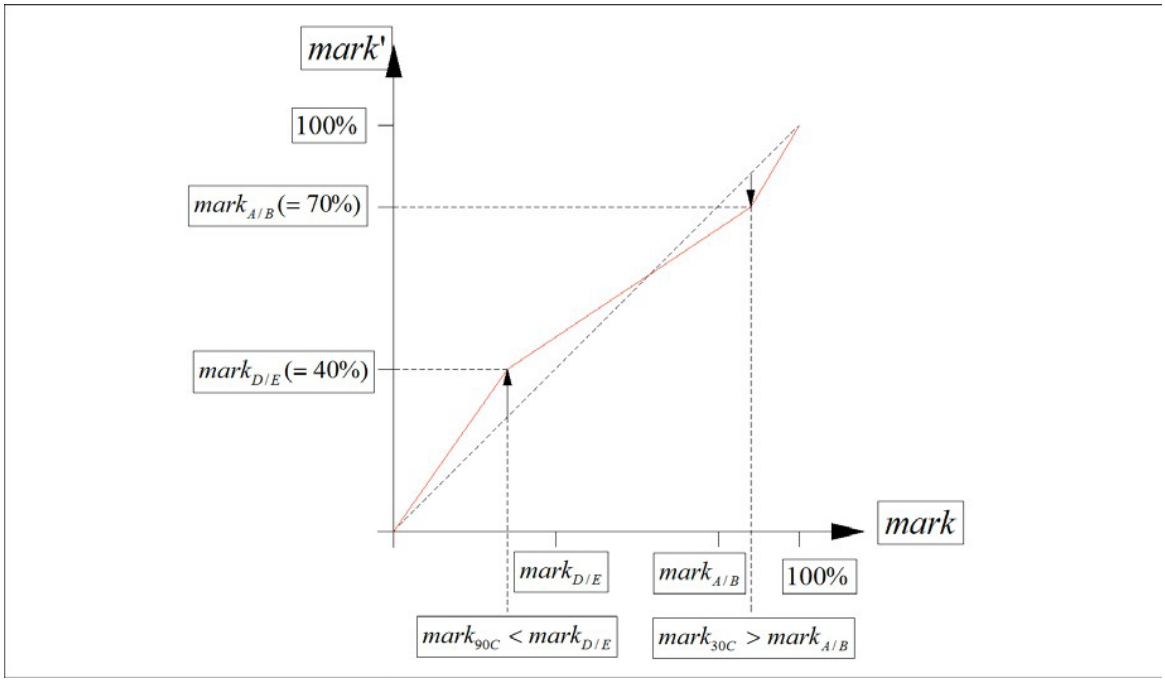
$$\text{elseif } mark < mark_{30C}$$

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

$$\text{else}$$

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

This process can be represented as a graph as follows:



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

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

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

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

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:

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

1st and 2nd Year EE and EIE Scaled Modules 2021

Course Code	Course Title	Pass Mark	Top Mark
ELEC40002	Analysis and Design of Circuits	36	70
ELEC40004	Programming for Engineers	40	83
ELEC40006	Electronics design project 1	40	71
ELEC40009	Topics in Electrical Engineering	40	74
maths	Mathematics 1 (E-stream and I-stream)	34	70
ELEC50001	Circuits and systems	40	71
ELEC50002	Communications	40	91
ELEC50003	Computer Engineering Design Project	40	78
ELEC50004	Control systems	40	75
ELEC50006	Discrete mathematics	40	82
ELEC50007	Electromagnetics	40	70
ELEC50008	Electronics design project 2	40	77
ELEC50009	Information Processing	40	70
ELEC50010	Instruction Architectures	40	78
ELEC50012	Power Electronics and Power Systems	40	74
ELEC50013	Signals and Systems	40	70
ELEC50014	Software Systems	40	85
maths	Mathematics for Engineers II (E-stream and I-stream)	40	70

Years 3 and 4 Adjustment Data

Course	Title	Original Average for Course including Coursework when relevant %	Original Exclusive Average for same population %	Adjustment %
EE3-01	Analogue Integrated Circuits and Systems	87.12	69.22	-8.95
EE3-03	Communication Systems	80.33	70.24	-5.05
EE3-05	Digital System Design	80.26	72.79	-3.73
EE3-07	Digital Signal Processing	65.45	73.26	3.90
EE3-12	Optoelectronics	81.73	72.37	-4.68
EE3-13	Electrical Energy Systems	49.42	69.78	10.18
EE3-27	Principles of Classical and Modern Radar Systems	91.00	68.08	-11.46
EE4-07	Coding Theory	85.10	75.89	-4.60
EE4-08	Digital Image Processing	74.95	68.90	-3.02
EE4-10	Probability and Stochastic Processes	66.68	74.49	3.90
EE4-16	Analogue Signal processing	84.38	68.83	-7.77
EE4-17	High Performance Analogue Electronics	67.14	74.30	3.58
EE4-25	Design of Linear Multivariable Control Systems	68.04	59.26	-4.39
EE4-27	Systems Identification	62.29	73.77	5.74
EE4-40	Information Theory	49.30	71.53	11.11
EE4-50	Sustainable electrical systems	66.56	74.47	3.95
EE4-51	Power system economics	77.38	69.16	-4.11
EE4-66	Topics in Large Dimensional Data Processing	62.77	74.94	6.08
EE4-71	Hardware and Software Verification	84.00	69.27	-7.36
EE3-G	3rd Year Group Project	79.51	68.70	-5.40